

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society

Volume 22

JUNE, 1939

No. 6

PAGES' PERIDURAL ANESTHESIA*

A Report of 3,826 Cases

DR. VICENTE RUIZ
Buenos Aires, Argentina

SINCE the beginning of 1932, and for the first time in Argentina, we have been carrying out experiments at this clinic with a new anesthetic method, epidural or peridural anesthesia. This technic was devised in 1920 by a Spanish surgeon, Dr. Fidel Pagés. Since Pagés died prematurely and was able to publish only one paper, in 1921 (*Revista Española de Cirugía*) recording the results he obtained in forty-three cases, this new method passed almost unnoticed. A few years ago, however, Prof. Dogliotti,^{3,4} of Prof. Uffreduzzi's clinic at Torino, described a technic bearing a remarkable similarity to that of Dr. Pagés'.

It should be mentioned that other investigators had previously tried a similar procedure, but their results were unsatisfactory. Among them was Corning, who in 1885 endeavored to modify spinal anesthesia, but without success. Later, Sicaud (1901) and then Cathelin, advocated the use of epidural injections of anesthetics for therapeutic and surgical purposes, but they followed the sacral route and sought only to anesthetize the lowest spinal nerves. Other surgeons such as Laewen (1910), Tuffier, Reclus, Chipault, Hamcart, Schlimpert, Pauchet, Kroning, Schneider, Kehrer (1916), Stoëckel, and Bleek, injected sacally larger quantities of anesthetic with a view of obtaining a higher zone of anesthesia. Some of these workers, besides performing epidural anesthesia, injected veronal, morphine, and scopolamine. This brief historical survey is important in that it will prevent one from mistaking Cathelin's sacral epidural anes-

thesia for the method we are about to describe. The former method is not used for operations in the abdomen, thorax, neck and limbs as is the latter.

The results obtained by the foregoing surgeons were on the whole unsatisfactory, as has already been stated. Epidural anesthesia fell therefore into disuse because of its irregular results and several fatal accidents. The technic conceived by Pagés surpasses the others in so far as it does away with the need for preliminary medication, is generally always harmless and yields consistent results.

At this point it is well to recall that there is no communication between the peridural and subarachnoid spaces, so that an anesthetic injected into the former cannot cause bulbar accidents. Besides, it should be borne in mind that the peridural space has a negative pressure, to which the "drop sign," to be described later, is due.

Technic

We use at this clinic an ordinary 10 cm. syringe, and a long, thin needle with a short bevelled edge, which was designed by Prof. Gutiérrez. The anesthetic employed is 1 per cent procaine (novocain) solution which is prepared at the moment of the operation; 1.20 grains of Bayer's, previously tyndallized, crystallized procaine is diluted in a wide-necked graded flask containing 60 c.c. of sterile physiologic saline solution. To this solution 10 drops of 1:1000 epinephrine solution are added; this delays absorption of the anesthetic by tightening the vessels, thus facilitating a more prolonged contact of the anesthetic with the spinal nerves.

*From the Clinic of Prof. Alberto Gutiérrez, Spanish Hospital, Buenos Aires, Argentina.

After trying several solutions we have definitely adopted the 2 per cent solution because of its effective results and safety. When the anesthetic solution is ready we inject it with the patient in a sitting or lateral decubital position on the operating table. The former position is preferable, the latter being used only exceptionally (in the case of high-strung nervous patients, and so forth).

The technic followed in the first part of peridural anesthesia is just the same as that for spinal anesthesia; the spinous processes are palpated and the puncture is made medially or laterally. We prefer the middle line for the following reasons: (1) the peridural space is wider here, that is to say, there is a greater space between the dura mater and the yellow ligament, the endorachid veins, which are on the sides, are less likely to be injured, and (3) it is easier to make the puncture.

Site of puncture.—Experience has indicated that it is immaterial whether the puncture is made between the first and second lumbar vertebra, between the second and third, or between the third and the fourth; the last, however, is the zone we generally always choose. Puncture may also be made in the lower part of the thoracic column, but this we have seldom tried. By making the puncture between any of the lumbar vertebræ, anesthesia is produced that extends from the clavicle to the lower limbs, because when the solution spreads through the peridural space it reaches the spinal nerves. However, if only a small area of anesthesia is desired (it should be remembered that this anesthesia is metameric, and we can consequently choose the places where to make it), we should bear in mind the vertebroradicular and vertebromedullary topography and the fact that the innervation of the abdominal or thoracic wall does not correspond with the innervation of the viscera.⁵

"The drop sign."—After piercing the skin and the subcutaneous tissue with the needle and its mandrin, we reach the supraspinous ligament. Before continuing the puncture we withdraw the mandrin, take the syringe filled with the anesthetic solution and try to inject the liquid. Naturally, resistance is offered by the supraspinous ligament which hinders the entrance of the

liquid; the syringe is then withdrawn and the liquid remains, filling the needle and its pavilion. We proceed now to drive the needle in, millimetrically, being careful that the thumb and forefinger do not cause the drop remaining in the pavilion to fall. The needle penetrates the supraspinous ligament; then the interspinous ligament and last the yellow ligament; this is felt, more or less clearly, with the fingers. When the tactile sensation is perceived (and sometimes there is a slight click, too), the drop is absorbed, sucked in by the negative pressure of the peridural space. Thus we are sure that the end of the needle is in the space. This fact was observed, for the first time by Prof. Gutiérrez, who called it the "drop sign." This sign, which is noticed in most cases, renders the technic of peridural anesthesia easier and places it within reach of a greater number of surgeons. The drop may be absorbed rapidly or slowly; in a few instances it suffers only a slight oscillation. At this moment the syringe filled with anesthetic solution is applied to the needle and it is seen that, when driving the piston, the liquid penetrates without difficulty, just as when making an intravenous injection, for instance.

When the point of the needle enters the yellow ligament it may happen that instead of the drop being absorbed, cerebrospinal fluid flows out; this may be due to two factors: (1) excessive penetration of the needle, or (2) the dura mater may adhere to the wall of the rachis, and the peridural space may be reduced to a minimum or may have disappeared. If the flow of cerebrospinal fluid is due to excessive penetration of the needle, which has perforated the dura mater the needle is withdrawn millimetrically, and, when the liquid stops flowing, we test with the mandrin to see that the needle is not obstructed. Then the patient is required to cough. Finally one can still make a further test by aspirating with the empty syringe. After all these tests have been carried out it is safe to begin the anesthesia. It may also happen that when driving the needle in it will come up against a vertebra, or owing to puncture of a vein, blood may flow; in both instances the needle should be withdrawn partially or totally and puncture should be begun anew.

From the foregoing it may be concluded that there are two ways of injecting procaine solution: a direct and an indirect way. Injection is

direct when the needle is introduced into the peridural space only, and indirect when it is introduced into the subarachnoid space, as in spinal anesthesia. As soon as cerebrospinal fluid flows, the needle is withdrawn a few millimeters until the fluid stops flowing, thus indicating that the point of the needle has remained in the peridural space.

Once it is certain that the needle is in the peridural space, injection of the anesthetic is begun, usually by the fractional method, as we shall explain later. It is obvious that the direct way is preferable and we follow it in most cases.

The distance to which the needle penetrates before it reaches the peridural space varies greatly with different patients, since it depends on various anatomic factors; the extreme figures we have recorded range between 2 and 8 cm.

We consider the technic employed by us better than the one recently described by Dogliotti. The Torinese professor uses 30 to 60 c.c. of 1 to 1.5 per cent procaine solution, and he appears to prefer the lateral decubital position in making the injection and he does not seem to be acquainted with the "drop sign." He follows a method of reaching the peridural space which we do not deem absolutely without danger. Moreover we disagree with him when he says that peridural anesthesia should not be used for major operations on interior genital organs; our statistics in this respect are conclusive and prove otherwise.

Amount of solution to be injected.—From our experience we can state that the amount of solution to be injected and the procedure employed depend on the importance of the operation and the constitution and weight of the patient. For instance, we have performed appendicectomies with only 20 c.c. of a 2 per cent solution of procaine, and many operations with only 35 c.c., but to secure good anesthesia for any of the ordinary gynecologic procedures in the abdomen, however, 40 or 50 c.c. are injected. The solution should be introduced slowly either all at one time or in portions. In the latter case we inject 5 c.c. and then wait five minutes to ascertain the sensibility and motility of the lower limbs. Once we are positive we have not obtained spinal anesthesia the rest of the solution is injected. To those who try peridural anesthesia for the first time, we advise this procedure.

Effects of procaine anesthesia.—The reactions produced by procaine depend to a certain extent on the emotional stability of the patients and any idiosyncrasy they may have. In some cases mere puncture of the skin is enough to produce sweating, fainting, pallor, and so forth. Most patients, however, tolerate the injection perfectly and it causes only slight pallor, dryness in the mouth, tachycardia, cardiac erethism and an epigastric beat due to erethism of the abdominal aorta. We are convinced that, provided the injection is well made, it very rarely causes any trouble.

In our clinic we record carefully on the "anesthetic file," all the sensations experienced by the patients. From a study of 500 files we have arrived at the following conclusions regarding modifications in arterial pressure: immediately after the puncture is made the previous maximal arterial pressure increases and the previous minimal pressure decreases, although to a lesser degree. At the end of the operation both maximal and minimal pressure are seen to have diminished in the same proportion. The pulse rate is quickened moderately after anesthesia and a slight increase is observed also at the end of the operation.

After the injection the patient is made to lie down and 0.25 gm. of caffeine is injected. A zone of anesthesia usually appears in the abdomen after some ten minutes, depending on the place where the puncture was made, and gradually this spreads upward and downward, producing insensibility to thermal pain and tactile anesthesia. This zone of anesthesia thus extends from the lower portion of the abdomen, in most cases after forty minutes up to the second intercostal space (and sometimes even up to the chin) and then down to the feet. Before beginning the operation it is usually necessary to wait for twenty-five to thirty minutes, although we have begun appendicectomies, for example, only ten minutes after the injection; this, however, is exceptional.

With the usual dose of 35 to 45 c.c. of procaine solution anesthesia lasts for from an hour to an hour and a half and, as a result of the great muscular relaxation and visceral immobility produced the most varied operations in the abdomen can be performed, so much so that in many cases the operation resembles dissection.

Sensibility to pain is the first thing to disappear, then the sense of touch and of heat. Tendinous and cutaneous reflexes are absent in the anesthetized area as well as visceral sensibility.

In a few cases, traction on the round ligaments, as when doing ligamentopexis, has provoked some transient nausea or vomiting, and this fact, observed from time to time, has shown the need for anesthetizing the solar plexus if absolute abdominal immobility is desired. This can be secured by puncturing between the first and second lumbar vertebrae. This procedure does not in the least interfere with the operation and takes but a short time to carry out.

I would like to emphasize the fact, however, that it is advisable to wait for some time (about twenty minutes) rather than to hasten to operate, as I have seen cases in which the zone of anesthesia increased after the operation was over. Above all it should not be forgotten that it is necessary to wait thirty minutes when operating on the perineum for it takes a longer time to produce anesthesia in this region.

The postoperative condition of the patient is quite satisfactory, since untoward reactions do not follow this method of anesthesia. Nausea and vomiting, which so often afflict those who are operated on by inhalation anesthesia, are reduced to a minimum and the headache and backache which are induced by spinal anesthesia are also absent. In only one case was rachialgia observed, and this only for a day, at the site of the puncture. As this was one of the first cases in which we attempted this form of anesthesia, pain was probably caused by the liquid being introduced in the interspinous or yellow ligaments. The advantages of peridural anesthesia can be appreciated not only during operation, but especially during the postoperative period when patients have undergone long and serious procedures.

Complications.—Before referring to the cases in which this method of anesthesia has been successful and summarizing the results obtained in our clinic in 3,826 cases, I shall dwell at some length on the enlightening and interesting subject of failures and accidents observed when using peridural anesthesia. In this respect we are very strict and class as failure either those cases in which anesthesia was not obtained or those in which it was incomplete or limited as well as when accidents occurred with its use.

In 1932, out of 202 cases, we had twelve failures; in six cases anesthesia was not obtained, while in the rest it was necessary to complete the operation with ether, chloroform, or by local anesthesia. However, of a total of 3,826 cases in which peridural anesthesia was performed, the number of failures was only forty-one, including cases in which only partial anesthesia was obtained.

This small number of failures could certainly be decreased still further by limiting the number of anesthetists, for in Prof. Gutiérrez' Service each surgeon anesthetizes his own patients and even general practitioners do it. Although the technic is not at all difficult, it requires a certain amount of skill which only practice can give. This and the fact that at first we used only a 1 per cent solution of procaine account for most of our early unsuccessful cases.

Failures and accidents with this form of anesthesia are due to various causes: (1) faulty technic, (2) use of too weak a solution, or (3) an insufficient amount of solution. I deliberately do not mention the possibility of some anatomic anomaly that might prevent the complete diffusion of the anesthetic or the fact that the patient may be "raquirresistente," or "spine resistant," as these circumstances might be too often invoked to justify failures. Generally speaking, lack of success can be traced to lack of ability on the part of the anesthetist, ignorance of some of the details of technic and lastly, to some very special instances of ossification of the supraspinous and interspinous ligaments, deviations or deformations of the spinal column, or obesity. Under those conditions even the most skillful anesthetist may fail. In this connection I may say that on two occasions, after having tried in vain to anesthetize the patient, they were left for a later operation, when puncture could be satisfactorily made.

It is to be regretted that some surgeons have tried Pagés' method without first having quite mastered its technic, so that failures and even sudden deaths have occurred. As a result these surgeons have passed an unfavorable judgment on peridural anesthesia apparently forgetting that a gram of procaine cannot be injected into the cerebrospinal fluid with impunity.

In the 3,826 cases in which peridural anesthesia was employed at our clinic we have had two serious accidents caused by the anesthetic and

three fatal cases in which we feel certain that death was not caused by anesthesia, as necropsy, had we been able to make it, would have proved. The first case in which death occurred was that of a woman sixty years of age, who had mitral insufficiency. In an operation for hemorrhoids, 35 c.c. of procaine solution was injected; she underwent the operation well but, five minutes afterward, had a heart attack and died. In the second case the patient, fifty years old, had frequent arrhythmia. She had a uterine myoma and her physician refused radiotherapy. Puncture was difficult in this case because the adipose panniculus prevented palpation of the spinous process. Although she received an injection of 45 c.c. of procaine, a great part of the solution very likely remained out of the peridural space, as anesthesia was partial and the patient began to complain when the uterine pedicles were being held with the forceps. Ether was given to suture the abdominal wall and when the aponeurosis was being closed she had a syncopal attack and died. The third case was that of a woman, forty-five years of age, who had intestinal occlusion and peritonitis of forty-eight hours' duration. Death occurred when the abdomen was being sutured.

As to the serious accidents, one happened while Dr. Gutiérrez was giving the anesthetic, in the other I was the anesthetist. In the first case the patient had a hydatid cyst on the upper surface of the liver; puncture was made indirectly, between the third and fourth lumbar vertebrae. Shortly after injection respiratory, and later cardiac, paralysis developed, but this was treated with adequate medication. As this accident has been explained at length in a previous report, I shall note here only that three weeks afterward, the patient was operated on successfully using peridural anesthesia. The second accident was that which befell a patient of mine, a woman forty years of age. She was in an undernourished condition and a Wertheim operation was to be performed. Both ureters were catheterized and puncture was then made with the patient in the left lateral decubital position. The "drop sign" was positive. Forty-seven c.c. of 2 per cent procaine solution had been injected when the patient felt slightly giddy. The pulse was soft but even and had a rate of 85 beats per minute. The maximal arterial pressure was 10 and the minimum 4 c. At this time the patient

said in a weak voice that she could not breathe well. The pulse continued soft and regular and the thorax, with the intercostal spaces slightly shrunk, hardly moved. Seeing that the patient did not react to the medication given, we employed artificial respiration for three hours. At the end of two and a half hours, she began to breathe irregularly and intermittently, later deeply and rhythmically. Consciousness came back with the respiratory movements, the conjunctival reflex returned and mydriasis disappeared. All of this time the heart beat regularly, although at times it was difficult to feel the radial pulse. Cyanosis was not observed nor were the limbs cold. When the patient recovered, her pulse was regular and beat at the rate of 63 per minute.

In this case the positive "drop sign" eliminated the possibility of penetration of the anesthetic solution into the subarachnoid space and its mingling with the cerebrospinal fluid. The accident was of a respiratory type: paralysis of the diaphragm and of the intercostal muscles. Was it due to anesthesia of the phrenic nerve, or were the intercostal nerves inhibited at first and did the diaphragm then become fatigued, producing reflex bulbar anoxemia? Shrinking of the intercostal spaces leads us to think the last hypothesis is the true one. Rapid diffusion of the anesthetic liquid into the peridural space in addition to the fact that the patient was in the left lateral decubital position and was in an undernourished condition, must have caused the accident. A month later this patient was operated on successfully using 45 c.c. of procaine solution by the peridural route.

Results*

Our 3,826 patients varied between fifteen and seventy-eight years of age, and underwent a variety of operations, such as, gastrectomy, gastroenterostomy, resection of the intestine, abdominoperineal procedures, appendectomy, herniorrhaphy, cholecystectomy, cholecystostomy, operations for cysts of the liver, nephrocolopexy, nephrostomy, nephrectomy, operations for retroperitoneal tumors, Albee operations with costal graft, osteotomy, amputation, and extirpations of the mammary gland including the pectoral muscles and axillary ganglions.

*Editor's Note.—In a letter dated April 17, 1939, at Buenos Aires, Dr. Ruiz writes: "At present, the number of cases in which peridural anesthesia has been used at our Spanish Hospital, is over 5,300."

Of the 962 gynecologic operations performed up to May 1, 1937, 735 were by the abdominal route, 227 by the vaginal route.¹⁸ While we have performed every kind of gynecologic operation using this method, for the sake of brevity we will

TABLE I. PERCENTAGE OF CASES IN WHICH VARIOUS FORMS OF ANESTHESIA WERE USED

Form of anesthesia	1930	1931	1932	1933
General	68.00%	67.00%	26.20%	4.01%
Local	25.60%	27.00%	35.50%	12.40%
Spinal	3.40%	4.60%	2.50%	0.24%
Miscellaneous .	3.00%	3.40%	4.46%	1.93%
Peridural			30.90%	81.20%

refer only to two cases which afford ample evidence of the advantages of peridural anesthesia. One patient was a woman without a vagina for whom the Baldwin-Mori operation was carried out by Dr. A. Gutiérrez, using 50 c.c. of procaine solution; anesthesia lasted for two and a half hours and only at the end was it necessary to give ether. The patient underwent the operation satisfactorily and the postoperative course was uneventful, her general condition not betraying the intense traumatism she suffered. The other patient had a sigmoid-uterine fistula resulting from abortive attempts five months and a half before entering the clinic; the breach was so large that the woman defecated through the vagina and a cecal anus was made by Dr. A. Gutiérrez for temporary relief; 45 c.c. of procaine solution was injected peridurally. Two months afterward the fistula was closed, although with some difficulty because of adhesions between the sigmoid colon, loops of small intestine and uterus. The operation lasted for an hour and forty minutes and 50 c.c. of solution were injected. The postoperative stage was satisfactory and a month later, the cecal anus was closed using 35 c.c. of procaine solution.

The results obtained with peridural anesthesia are such that, in Dr. Gutiérrez' clinic, it has practically supplanted other anesthetics (Table I).

Conclusions

It is admitted that peridural anesthesia is not perfect, inasmuch as there is some risk attached to its use, but it is equally undeniable that, so far, it seems to be superior to the method of anesthesia commonly used. It is safer than spinal

anesthesia because it has all the advantages of that method and none of its disadvantages (bulbar accidents, cephalgia, rachialgia, paralysis, vomiting, and so forth). It is better than anesthesia with ether or chloroform because it is much less toxic; it may be used in cases when ether or chloroform are contraindicated; it may be repeated without further inconvenience and the postoperative stage is excellent. Local anesthesia is less toxic, but it cannot be used for nervous high-strung patients; it requires greater anatomic skill on the part of the surgeon and a very accurate diagnosis to avoid exploratory maneuvers, and it takes much time—a serious drawback.

We believe that Pagés' peridural anesthesia represents real progress in surgery, although a definite verdict cannot as yet be passed. In the meantime, together with other surgeons in the country who have followed our example, we are gathering experience and data.

References

1. Barabará, Amadeo, Rodríguez, José A., and Plazaola, Domingo: Anestesia peridural de Pagés. *Rev. de Cirugía*, December, 1933.
2. Cieza, Rodríguez M., and Canestri, I.: Anestesia epidural segmentaria. *Anales de la Facultad de Medicina de la Plata*, 1937.
3. Dogliotti, A. M.: Un promettevole metodo di anestesia troncario in studio: la rachianestesia peridurale segmentaria. *Boll. y Mem. Soc. Piem. di Chirurgia*, 1931.
4. Dogliotti, A. M.: A new method of block anesthesia; segmental peridural spinal anesthesia. *Am. Jour. Surg.*, 20: 107-118, (April) 1933.
5. Gutiérrez, Alberto: Anestesia metamérica peridural. "El Día Médico," August, 1932. *Rev. de Cirugía*, December, 1932.
6. Gutiérrez, Alberto: Anestesia extradural de Pagés—V Congreso Nacional de Medicina, 1934.
7. Gutiérrez, Alberto: Conferencia, dada en Rosario en la Facultad de Medicina, 1935.
8. Gutiérrez, Alberto: Conferencias dadas en la Facultad de Medicina de San Pablo (Brasil) y en la Asociación Médica de Rio de Janeiro (Brasil), 1936.
9. Gutiérrez, Alberto, and Rubido, Manuel López: Resultados obtenidos con la anestesia peridural. *Comunicación al IV Congreso Nacional de Cirugía*. *Rev. de Cirugía*, February, 1933.
10. Gutiérrez, Alberto: Valor de la aspiración líquida en el espacio epidural en la anestesia peridural. *Rev. de Cirugía*, March, 1933.
11. Labandibar, Bernardo, and Gutiérrez, Elías: Estudio comparativo de las anestésicas empleadas en el Servicio desde 1929 a 1933. *Rev. de Cirugía*, June, 1933.
12. Monserrat, José L.: La anestesia peridural en cirugía urinaria. *Rev. Argentina de Urol.*, año II, p. 341.
13. Ontaneda, Luis: Tensión del espacio epidural. *Rev. de Cirugía*, October, 1932.
14. Penin, Raúl: Sobre anestesia metamérica epidural de Pagés. *Rev. de Cirugía*, April, 1933.
15. Ruiz, Vicente: La anestesia peridural en Ginecología. *Comunicación a la Sociedad de Ginecología y Obstetricia* en Noviembre de 1932. *El Hospital Español*, año III, No. 17.
16. Ruiz, Vicente: La anestesia peridural de Pagés en Ginecología. *Rev. de Cirugía*, December, 1933.
17. Ruiz, Vicente: La anestesia peridural de Pagés en Ginecología. Consideraciones sobre 238 casos. *El Hospital Español*, año IV, Nos. 6 and 7.
18. Ruiz, Vicente: La anestesia peridural de Pagés en Ginecología. Consideraciones sobre 415 intervenciones ginecológicas en un total de 1431 anestésicas peridurales. *Rev. Médica Latino Americana*, año XX, No. 233.
19. Sammartino, Emilio S.: La anestesia peridural de Pagés en la cirugía de urgencia. *Rev. de Cirugía*, February, 1934.
20. Valle, Delfor del, and Pastoriza, Raúl: Sobre anestesia peridural de Pagés. *Rev. de Cirugía*, August, 1933.
21. Zorraquín, Guillermino: Fisiología quirúrgica del espacio peridural en la anestesia epidural. *El Día Médico*, August 21, 1933.

THE TREATMENT OF PNEUMOCOCCIC MENINGITIS WITH SULFANILAMIDE AND SPECIFIC SERUM*

Report of a Case with Agranulocytosis and Recovery

ROYAL C. GRAY, M.D., Ph.D.

Minneapolis, Minnesota

and

BLAIR ADAMS, M.D.

Loveland, Colorado

PNEUMOCOCCIC meningitis may be a sequelae of pneumonia, middle ear and mastoid and other skull sinus infection, or of skull fracture. It is a rare complication of lobar pneumonia. More frequently it is secondary to otitis media and sinusitis. However, it often occurs entirely independent of any other clinically detectable lesion. The onset is usually acute with high fever, prostration, leukocytosis, and spinal fluid findings such as increased pressure, cell count, and protein, indicative of severe meningeal inflammation. Pneumococci may be identified morphologically in a spinal fluid smear but the accurate and therapeutically proper diagnostic method is by culture and typing. There is no particular distribution of types except a higher frequency of Type III incident to middle ear and mastoid infection.

The mortality in pneumococcic meningitis is practically 100 per cent. In the available American and English literature there are reported less than 100 recoveries in bacteriologically proven cases of this disease. The treatment employed singly or in combination in these cases was: spinal or cisternal-spinal drainage, urotropin, optochin hydrochloride, antimeningococcus serum, sulfanilamide, antipneumococcus serum, M. & B. 693 (sulfapyridine), and no treatment at all.

Satisfactory drainage is difficult since the purulent spinal fluid is usually too thick. Methenamine has only a very questionable general antiseptic value. Optochin hydrochloride has scarcely stood the test of time in the treatment of pneumonia. Antimeningococcus serum certainly cannot be remedial in pneumococcic meningitis. Spontaneous recovery might conceivably occur in any infection but is a forlorn hope in pneumococcic meningitis.

Sulfanilamide has been used effectively in meningitis due to streptococcus hemolyticus, influenza bacillus, meningococcus, and pneumococ-

cus. Neal and Applebaum⁹ reported fourteen cases of pneumococcic meningitis treated with sulfanilamide with three recoveries (Types IV, XXIX, and XXXI). The authors called attention to the fact that sulfanilamide penetrates all tissues, is readily absorbed into the general circulation and its concentration in spinal fluid is nearly equal to that in blood a few hours after even oral administration. Three cases of pneumococcic meningitis with recovery have also been reported by Allan, Mayer and Williams.¹ Two of their cases (Types XXIV and XXIX) were treated with sulfanilamide only and one (Type XX) had also repeated spinal drainages but improvement did not appear until a radical frontal sinus operation was done to remove the focus of the infection.

Agranulocytosis may develop as a serious toxic reaction to sulfanilamide. It may be indicated by a secondary rise in temperature and therefore Long and Bliss⁸ recommend detailed observation of the patient, careful temperature record, and daily blood studies. Jones and Miller⁷ reported one case with recovery and noted that malignant neutropenia may develop suddenly without rash, fever, or any toxic symptom. Johnston⁵ compiled from the literature twenty cases of agranulocytosis with six recoveries. The total dose in each case was from 30 to 60 grams. The duration of treatment is more significant as toxic reactions, including agranulocytosis, are more likely if treatment extends past two weeks. Of fifty ambulatory patients treated with sulfanilamide by Britton and Howkins,² each in a total dosage of 21 grams over a fourteen-day period, 46 per cent developed transient polymorphonuclear leukopenia. The treatment usually recommended for agranulocytosis is pentnucleotide, defibrinated blood transfusions, liver extract, and forced fluids since sulfanilamide is excreted by the kidneys. The complete story of sulfanilamide and similar compounds in chemotherapy has been reviewed by Holman and Duff.⁴

*From the Division of Nervous and Mental Diseases, University of Minnesota Medical School.

PNEUMOCOCCIC MENINGITIS—GRAY AND ADAMS

TABLE I. DETAILED SPINAL FLUID STUDIES

Hospital Day	Pressure mm. Hg.	W.B.C.	P.M.N. %	Mono. %	Protein mgm. %	Sugar mgm. %	Culture
1	22	6,800	98	2	153	89	Pneumo. IV
2	30	9,200	94	6			
3		2,800	88	12			0
4		8,000	97	3			
5		13,300	99	1			0
6		750	95	5			
7		2,800	98	2			0
8		500	100		204	66	
9		425					
10		333					0
11		245					
14	11	20	85	15	39	59	
19		35	30	70	117	69	

The treatment of pneumococcic meningitis with sulfanilamide alone or in combination with specific antipneumococcic serum is described in an excellent article by Finland, Brown and Rauh.⁸ They reported ten cases so treated with six recoveries. These authors caution that highly potent specific serum in any considerable quantity intraspinally might cause a precipitation of the bacteria into clumps and thus mechanically interfere with spinal fluid circulation and drainage. They first prevent or control pneumococcic bacteremia by sulfanilamide orally and subcutaneously and specific serum intravenously. When a balance of specific antibody is thus established in the circulating blood they use the patient's own fresh serum intraspinally.

Recently a new drug, M. & B. 693, first described by Whitby,¹³ has been used effectively in England and lately in this country in the treatment of pneumonia and pneumococcic meningitis. Like sulfanilamide, it is a sulfonamido compound but has one hydrogen of the sulfonamido group replaced by a basic pyridine group. It is referred to by the initials of its manufacturing chemists, May & Baker, and its serial number. It has also been termed sulfanilamide-pyridine but is now known as sulfapyridine. Whitby,¹² Reid and Dyke,¹⁰ and Robertson¹¹ have reported recoveries from pneumococcic meningitis treated with M. & B. 693 (sulfapyridine). Sulfapyridine is bacteriostatic and bacteriocidal, but is capricious and sometimes will not act against a given type or strain of pneumococcus. The drug may precipitate in the kidney as acetylsulfapyridine with resultant hydronephrosis and anuria. Johnson⁶ has noted agranulocytosis following treatment with this drug which, as with sulfanilamide, is probably due to idiosyncrasy.

Case Report

A nineteen-year-old single Scandinavian farm laborer was admitted to the University of Minnesota Hospital on May 10, 1938. His family and previous personal medical history were entirely negative. Three weeks before admission he had an apparently ordinary sore throat for two or three days and recovered completely. At noon on May 9, when he came in from his usual work in the field he complained of general malaise, chilly sensations, and a severe generalized headache. He had no appetite and went to bed. He seemed sound asleep at supper time and was not disturbed. At breakfast he could hardly be aroused and was forthwith brought to the hospital.

The patient was well developed and well nourished but obviously acutely ill. He was semi-comatose, irrational, restless, and very resistive to examination. The temperature was 102.2 F., pulse rate 100, respirations 22, and blood pressure 130/90. The skin was hot and dry and the face flushed. There was moderate injection of the conjunctivæ and a degree of catarrhal inflammation of both eardrums commensurate with any intracranial infection, but no evidence of suppuration in either middle ear cavity or any skull sinus. Heart, lungs, and abdomen were negative. The bladder was distended with urine. Neurological examination revealed bilateral positive Kernig sign, neck rigidity, slight blurring of both optic discs, and bilateral horizontal nystagmus. The deep reflexes were equal and active and the balance of the examination, in so far as it was possible, was negative. Roentgenograms of the skull and chest were negative.

A blood study was as follows: hemoglobin 77 per cent; red cells 3,500,000; white cells 9100, with neutrophils 80 per cent and lymphocytes 20 per cent. The blood non-protein nitrogen was 43 mgm. per cent and the sugar 146 mgm. per cent. Urinalysis was negative except for a faint trace of albumen and three plus sugar. Urinalyses were negative throughout on all subsequent examinations.

A lumbar puncture was done one-half hour after admission. The fluid was cloudy, under a pressure of 22 mm. of mercury, and contained 6800 white cells of which 98 per cent were neutrophils. The total pro-

tein was 153 mgm. per cent and the sugar 89 mgm. per cent. The Wassermann reaction and colloidal gold curve were negative. A smear of the spinal fluid revealed no organisms but a culture on blood agar showed a pure strain of pneumococcus Type IV by the Neufeld method of typing.

Treatment with sulfanilamide in a dosage of 80 grains daily in four divided doses was promptly instituted on May 10, the day of admission. The first dose was given with a feeding by stomach tube, the second in a hypodermoclysis, and all subsequent doses orally together with an equal amount of sodium bicarbonate. On May 11, Type IV antipneumococcus rabbit serum was obtained and during that and the next five days the patient received a total of 420,000 units of this serum. The first two doses, each 20,000 units intravenously and 20,000 units intraspinally, were given at two hour intervals. A third single dose of

lowing week, then decreased to 40 grains daily for four days, and finally discontinued on the nineteenth hospital day. The essential details of the patient's temperature, pulse rate, therapy, and blood leukocyte counts are shown graphically in Figure 1.

On May 19, the following neurological changes were noted: the pupils unequal with the left larger than the right, the right biceps reflex absent, and the left knee jerk diminished. Neck and back rigidity were still present but to a much less degree. The nystagmus had disappeared.

The patient required catheterization during the first twelve hospital days. On the twelfth and thirteenth days he was given pilocarpine, grains 1/10, four times daily. He had no difficulty in voiding after the first two doses of this drug. As soon as he became rational, at the beginning of the second week, it was noted that he had a profound bilateral nerve deafness. There

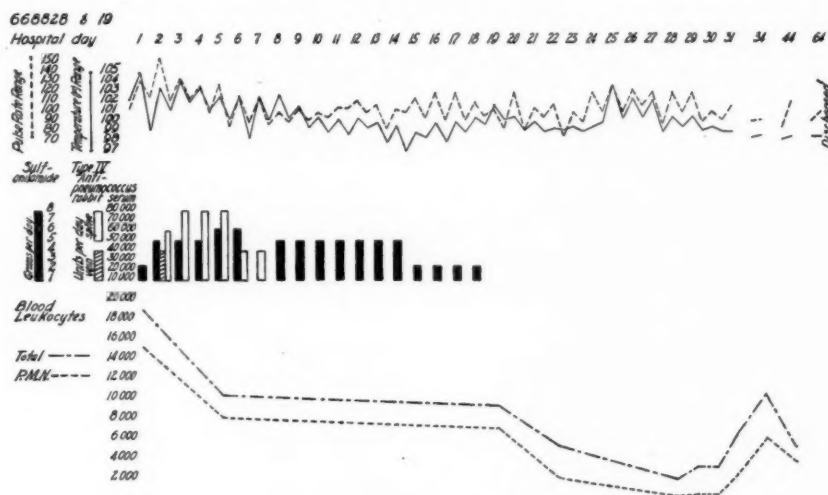


Fig. 1. Graph showing range of temperature and pulse, sulfanilamide and serum therapy, and blood leukocyte counts.

20,000 units intraspinally was given two hours later. Since the blood culture taken on admission was sterile after eighteen hours incubation, the serum thereafter was given only intraspinally in doses of 40,000 units twice daily for three days and once daily for the next two days. The serum was then discontinued and daily spinal drainages were done until the eleventh hospital day and again on the fourteenth hospital day when the temperature and spinal fluid findings were practically normal. Detailed spinal fluid studies are shown in Table I. After three days of sulfanilamide therapy, 80 grains daily, the blood concentration of the drug was only 3.0 mgm. per cent and therefore the dosage was increased to 100 grains daily. Two days later the level was 5.3 mgm. per cent, well below the therapeutic blood level of 10 mgm. per cent, but since the patient was then vomiting the drug was discontinued for that one day. It was resumed, at 80 grains daily for the fol-

lowing week, then decreased to 40 grains daily for four days, and finally discontinued on the nineteenth hospital day. The essential details of the patient's temperature, pulse rate, therapy, and blood leukocyte counts are shown graphically in Figure 1.

Progress of the illness otherwise seemed uneventful with gradual recession of the fever, disappearance of the neurological findings, and clinical improvement of the patient. On May 28, the nineteenth hospital day, a rise in temperature to 101.8 F. was noted. There were no unusual symptoms and the blood leukocyte count that day was 9500 with a normal differential. The fever rise was for that one day only, progressively declined the following days and on the twenty-second hospital day it was down to 99.4 F. However, the leukocyte count that day was 5250 with 40 per cent neutrophils, 48 per cent lymphocytes, and 12 per cent basophiles. A malignant leukopenia (agranulocytosis) was more definitely shown in the leukocyte and differ-

PNEUMOCOCCIC MENINGITIS—GRAY AND ADAMS

TABLE II. DETAILED BLOOD STUDIES

Hospital Day	Hgb. %	R.B.C.	W.B.C.	P.M.N. %	Lympho. %	Mono. %	Eosino. %	Morphology
1	77		19,100	80	20			
5	70	5,000,000	10,500	78	22			
7	75	3,500,000						
9	70	3,200,000						
19			9,500	75	23	1	1	
22	73	3,700,000	5,250	40	48			Basophiles 12%
28	80		2,000	13	70	6	11	
29			3,200	13	73	5	9	Toxic P.M.N.s
30			3,200	13	66	9	12	Few myelocytes
31			6,500	37	56	3	4	Few stab cells
34			10,600	57	38	4	1	leukocytoid and monocytoid lymphs
44	72		5,100	73	25	2		
59	75	3,670,000						

ential counts on the twenty-eighth day. No treatment was instituted for the agranulocytosis from which the patient made a spontaneous recovery by the thirty-fourth day when the leukocyte and differential counts were nearly normal. Detailed blood studies are shown in Table II.

An added complication appeared on the twenty-fifth hospital day when there was a sharp rise in temperature to 103.6 F. with evidence of pharyngitis, cervical adenitis, and left otitis media. A left myringotomy was performed and staphylococcus albus was cultured from the pus obtained from the middle ear. Recovery from this infection was prompt, the patient's temperature on the thirty-fourth hospital day was normal and remained so throughout the remainder of his total hospital stay of sixty-four days.

On June 20, when he first attempted to walk, his sense of equilibrium was found to be almost entirely lost. Caloric tests showed no response from either labyrinth. This, together with the deafness, indicated practically a complete destruction of both eighth cranial nerves. When he left the hospital on July 12 he had learned to walk fairly well by watching his gait carefully but he was still almost totally deaf. Otherwise he had made a full recovery from his illness.

The patient has been seen several times since then, the last time on December 7, 1938. Audiograms then showed slight increase in hearing acuity by air conduction for low tones in the right ear but still a total loss in the left ear. Bone conduction showed only a minimal residual for low tones in both ears. He had learned to compensate for the ataxia by vision and had acquired some skill in lip reading. Except for the only neurological sequela of the bilateral eighth cranial nerve involvement he was in excellent health.

Comment

Since both sulfanilamide and specific serum were used in this case the efficacy of either one alone could not be determined. Spinal drainages were done daily just preceding each intraspinal serum injection and for four days after serum was discontinued. The drainages were likely a helpful therapeutic adjunct but no more than

that. Eradicating a focus of pneumococcic infection, had there been one present, would have been of more value. The total amount of serum given was about twice that which is now considered sufficient; at the time this patient was treated there was no established therapeutic limit. The agranulocytosis was due to toxicity or idiosyncrasy to sulfanilamide, since the patient had nausea and vomiting when the blood level of the drug was only 5.3 mgm. per cent and had a secondary rise in temperature four days before the white blood cell changes were noted. Although the patient was catheterized twenty-five times the urine was regularly negative, probably due to the antiseptic action of the sulfanilamide. Deafness is often a sequela of meningitis but the added involvement of the vestibular branch of both eighth cranial nerves is very unusual.

Summary

1. A bacteriologically proven case of pneumococcic meningitis with recovery is reported.
2. The case was complicated by agranulocytosis and otitis media and had the unusual residual of complete bilateral eighth cranial nerve involvement.
3. Treatment was with sulfanilamide, specific antipneumococcus rabbit serum, and repeated spinal drainage.

Bibliography

1. Allan, W. B., Mayer, S., and Williams, R.: Pneumococcus meningitis with recovery. A report of three cases. *Am. Jour. Med. Sci.*, 196:99, (July) 1938.
2. Britton, C. J. C., and Howkins, J.: Action of sulphani-
lamide on leukocytes, a report on fifty ambulant patients. *Lancet*, 2:719, (Sept. 24) 1938.
3. Finland, M., Brown, J. W., and Raugh, A. E.: Treatment of pneumococcic meningitis. *New Eng. Jour. Med.*, 218: 1033, (June 23) 1938.
4. Holman, W. L., and Duff, G. L.: Sulphanilamide and

- similar compounds in chemotherapy. *Am. Jour. Med. Sci.*, 195:379, (March) 1938.
5. Johnston, F. D.: Granulocytopenia following the administration of sulphanilamide compounds. *Lancet*, 2:1044, (Nov. 5) 1938.
 6. Johnston, F. D.: Agranulocytosis following treatment with M. & B. 693. *Lancet*, 2:1200, (Nov. 19) 1938.
 7. Jones, H. W., and Miller, C. P.: Neutropenia following sulphanilamide. Report of a case. *Jour. Lab. and Clin. Med.* 24:121, (Nov.) 1938.
 8. Long, P. H., and Bliss, E. A.: Toxic manifestations of sulphanilamide. *Ann. Surg.* 108:808, (Nov.) 1938.
 9. Neal, J. B., and Applebaum, E.: Experience with sulphanilamide in meningitis. *Am. Jour. Med. Sci.*, 195:175, (Feb.) 1938.
 10. Reid, G. C. K., and Dyke, S. C.: Pneumococcal meningitis treated with M. & B. 693: Recovery. *Lancet*, 2:619, (Sept. 10) 1938.
 11. Robertson, K.: Case of pneumococcal meningitis treated with M. & B. 693. *Lancet*, 2:728, (Sept. 24) 1938.
 12. Whitby, L.: Chemotherapy of bacterial infections. *Lancet*, 2:1095, (Nov. 12) 1938.
 13. Whitby, L. E. H.: Chemotherapy of pneumococcal and other infections. *Lancet*, 1:1210, (May 28) 1938.

IDIOPATHIC BENIGN HYPERTROPHIC PYLORIC STENOSIS IN THE ADULT

FRANCIS E. KIBLER, M.D.

Austin, Minnesota

IN 1788, H. Beardsley of Connecticut recognized pyloric hypertrophy at an autopsy performed on a five-year-old girl.

Hypertrophic pyloric stenosis in adults was first recognized in 1835 by Jean Cruveilhier, who described and illustrated this condition in a volume of "Pathological Anatomy of the Human Body" published in Paris. His treatise was complemented by the presentation of two personally treated cases. J. Boas in 1898, reported two cases of hypertrophy of the pyloric muscle which had been positively diagnosed clinically and later confirmed at the operating table. He believed that the hypertrophy was secondary to inflammation and argued for "stenosing gastritis" as the etiological factor.

Incidence

Pyloric stenosis in the adult has been generally conceded to be quite uncommon. However, according to several writers, this condition is of much more frequent occurrence than is ordinarily believed. According to R. Rossle,²¹ specific examination in over 5,000 autopsies performed in Berlin and Basle, revealed that 3 per cent of adults were so afflicted, even with the extreme forms, and that from past histories, very few were known to have had associated symptoms during life. The discrepancy between the incidence and the clinical recognition of the disease is probably explained on the basis of a failure to recognize the symptoms per se, or to confuse them with the symptoms of a concomitant chronic gastritis, ulcer or biliary disease.

The manifestations of this lesion appear most commonly between the ages of twenty and forty, and occur more frequently in females than in

males in a ratio of about one and one-half to one, and are observed more frequently in members of the Latin race rather than in the Anglo-Saxon. All authors agree, however, that an inherited predisposition is necessary for the development of this disease.

Etiology

In reviewing the literature for the etiological concepts of this condition one is depressed by the multiplicity of the theories and staunch arguments presented for each, as to whether the hypertrophy is primary in the muscularis with secondary changes in the mucosa and submucosa, or vice versa; or whether the adult form is simply a carry-over of the infantile condition with late manifestations, or a separate and distinct lesion developing in adult life.

Morton¹⁸ and Deaver⁷ believe that a type of obstruction similar in all respects to the congenital form may arise from spasm of the pylorus. Conversely A. James Walton²⁰ maintains that the presence of great muscular hypertrophy indicates the presence of a congenital pyloric stenosis, in that evidence is lacking that hypertrophy will follow pylorospasm.

McClure,¹⁶ in reporting five cases pathologically similar to congenital pyloric stenosis, but occurring in adults, states that: "It is probable that these are all mild examples of the congenital disease, in which the obstruction has been overcome by hypertrophy of the gastric muscle and it is only later in life that compensation fails and symptoms become manifest."

Bassler² states that chronic alcoholism is a prominent factor in most cases, and that hypertrophic gastritis, with a subchlorhydric, achlor-

hydric or achylic condition, is always present and may be the primary factor.

Donati⁸ maintains that both congenital and acquired factors, especially those relating to the production of pyloric spasm, are involved in the pathogenesis.

H. Knauer¹⁴ very aptly writes that two different terms for the same or at least extremely similar disease entities indicate that the etiology has not been completely explained. Some apply the term hypertrophic pylorostenosis, assuming an abnormal narrowness of the mucosa (primary stenosis) followed by a secondary muscular hypertrophy, others adhering to pylorospasm as producing a "primary" tumor-like muscular hypertrophy. He believes that the various factors concur to produce what he designated as "pylorospasm in simultaneous hypertrophic pylorostenosis."

McNamee¹⁷ suggests the term "idiopathic pyloric stenosis," to which the writer would include benign hypertrophic, thus giving a term that is descriptive from both the pathological and clinical aspects, and at the same time non-controversial from the etiologic viewpoint.

Lerck-Hanssen,¹⁷ of Finland, concludes that the hypertrophy is the result of a chronic gastritis and prepyloric ulcer since one or both were always present in his cases of hypertrophic stenosis. These findings have been repeatedly borne out by American, German, English and French pathologists. Because of these associated antral and prepyloric inflammatory changes, the evidence favors the opinion that inflammation (chronic hypertrophic gastritis) is the most important single factor in the production of benign hypertrophy of the pylorus, relegating the congenital theory to a secondary position. Quoting Ross Golden¹⁰: "However, the foundation for the development of hypertrophic changes under proper stimuli must be considered from the viewpoint of a 'congenital predisposition.'"

In conclusion, the various theories may be summarized in the order of their respective merits:

1. Mixed theory: dependent upon two or more of the above mentioned concepts.
2. Congenital predisposition: latent in character and manifesting itself on activation by nervous stress and strain, or inflammation

(local or general), or progressive debility and the like.

3. Acquired: secondary to ulcer, gastritis, syphilis or tuberculosis, local evidences of which have disappeared.
4. Carry-over or continuation of the congenital stenosis of infancy.
5. Hypertrophying pylorospasm: dependent upon a prolonged hyperirritability of the parasympathetic nervous system with concomitant compensatory changes in the stomach, symptoms becoming increasingly manifest as compensation fails due to disruption of the viscerovisceral reflex of the component branches of the autonomic nervous system.
6. Neoplastic: the hypertrophy in reality a benign growth-myoma or fibromyoma.

Pathology

Cunha,⁶ using the term idiopathic benign hypertrophic pyloritis, maintains that the condition is not a simple acute or chronic inflammatory gastritis with the associated mucosal changes usually found, but rather a distinct clinical entity with a characteristic pattern limited to the pylorus, the most outstanding feature being a hypertrophy of the mucosa and submucosa with secondary edema and hypertrophy of the muscularis. The intense thickening of the mucosal layer with concomitant enlargement of the folds causes obstruction by encroaching on the pyloric canal. Secondary changes, including stasis, may be moderate or extreme. At autopsy, the true nature of the lesion is frequently modified, due to rapid diminution of the edema following death.

According to Savarese,²² the condition is "a special alteration of the pylorus characterized by a thickening of this portion of the stomach due to hypertrophy of the muscular tunic and without participation of the other layers." Thus by definition, the muscular hypertrophy is sharply distinguished from pyloric hypertrophy due to lesions primarily of different anatomical substrates, such as: simple inflammation, lues, tuberculous and neoplastic growths and peptic ulcers of the mucosa and submucosa.

Eustermann and Balfour⁹ define true pyloric hypertrophy as: "an enlargement or overgrowth of the pyloric muscle, without an apparent causa-

tive or associated lesion." They are convinced that primary muscular hypertrophy with the anatomical changes simulating the infantile type is uncommon, whereas the adult form is associated most frequently with duodenal, gastric or cholecystic disease, such as: peptic ulcer, gastritis and chronic cholecystitis.

Gross examination reveals a smooth circular or fusiform swelling completely encircling the pylorus. The consistency of the tumefaction varies from that of normal liver to the non-resilient firmness of cartilage. The tumor is usually sharply demarcated, but this is dependent upon the degree of associated secondary thickening and dilatation of the stomach wall. However, the duodenal extremity is always sharply differentiated, since the obstruction is at the proximal extremity. The tumor is freely movable through the normal range of pyloric mobility in the absence of a primary or secondary peri- or para-duodenal lesion. Fixation of any degree would immediately indicate underlying pathology of either the stomach, duodenum, gallbladder or pancreas. The cut surface reveals a variable thickening of the pyloric wall, chiefly of the muscular tunic, which is pale red in color and of a more fibrous consistency than normal muscle. The mucosa and submucosa strata are likewise thickened and edematous. The lesion specifically involves the entire length of the pyloric canal and is sharply confined to its borders, the caliber of the canal being determined largely by the degree of the hypertrophy of the circular (inner) muscular layer, while complete obstruction is dependent upon prolapse of the edematous or hypertrophic prepyloric gastric mucosa, or simple edema with or without hypertrophy of the pyloric mucosa itself.

Microscopic examination is essentially that of simple hypertrophy of the circular layer of the muscular tunic and to a less extent of the mucosa and submucosa. The muscle cells are of normal form and arrangement but increased in size—a true hypertrophy. No changes are present in the connective tissue stroma, serous or subserous layers. Occasionally there may be found a lymphocytic infiltration of the mucosa, which at times extends into the muscularis mucosa and submucosa.

According to Judd and Thompson,¹² hyperplasia is also associated with the hypertrophy, and

occasionally hyperplasia, atrophy or inflammation of the other layers of the pylorus is present, including the peritoneal covering. Savarese²² firmly believes that it is impossible, by both gross and microscopic examination, to differentiate between a true muscular hypertrophic stenosis and a pyloric hypertrophy associated with inflammatory changes, quoting: "distinction is dependent upon causal and evolutive differences of a process which is essentially the same in every case."

Symptoms

The symptoms of idiopathic benign hypertrophic pyloric stenosis are from early life multiple and variable, vague in character, with exacerbations precipitated by any intercurrent infection, patients obtaining at best only temporary relief from antispasmodics and various diets. As a result they wander from one doctor or clinic to another in search of aid, in the course of which they are subjected to many x-ray studies and other laboratory procedures, each doctor expecting to find an ulcer or neoplasm. In absence of either of these they are informed that they have "nervous indigestion" and earmarked as neurotic. However, with the onset of mechanical obstruction, a group of symptoms predominate the picture and mask those of the underlying cause or causes. Thus the true nature of the obstruction can be learned only by thorough investigation of the past history. Even then the internist and surgeon are very frequently baffled, not only as to etiology, but with regards to the diagnosis itself.

The usual clinical course is a syndrome of chronic intermittent, progressive, and finally continuous gastric dyspepsia occurring most frequently in young asthenic adults of the so-called high-tension type. Early, the symptoms may vary from time to time so as to mislead the clinician. Chronic pylorospasm is a frequent diagnosis, explained on basis of reflex irritation from a "chronic appendix," gallbladder, or colitis. In these cases an appendectomy gives only temporary, if any, alleviation of symptoms. Duodenal ulcer or duodenitis may be simulated, in that pain and discomfort appear within a few hours of eating, and in not a few, relief is obtained by ingestion of food, alkalies, or by vomiting.

As the obstruction manifests itself, the periodicity is lost and the attacks are longer and final-

ly merge one into the other. In the primary or idiopathic form, the symptoms are of long duration, frequently traced back to childhood and characterized by remissions and exacerbations; whereas, in the presence of a stenosing ulcer the intervals of relief, though not as long as in the idiopathic form, will be much more prolonged than that in carcinomatous obstruction.

Pain.—The subjective symptom of pain is due partly to the mechanical obstruction itself and partly to the associated secondary gastritis, with the result that the pain is continuous with exacerbations from ingestion of food or water. As the stomach dilates, losing its normal tubular form, the pain appears immediately after ingestion of food instead of after an interval as in pyloric ulcer. The pain at first is not severe, but is more a sensation of fulness and discomfort which steadily increases with time and as the stomach capacity increases. In addition to the constant dull aching pain, due to dilatation, there are waves of a more severe crampy nature, due apparently to peristaltic action.

Vomiting.—The truly characteristic vomiting is that of large quantities at long intervals. The longer the condition has existed the more tolerant the stomach becomes of its contents and the greater the retention before emesis appears.

Hematemesis and Melena.—In the presence of idiopathic muscular hypertrophy, fibrosing ulcers, and scirrhus neoplasms, loss of blood is unusual, although small quantities may be discovered by chemical analysis. However, with fungating growths, brisk hemorrhages may occur from time to time.

Appetite.—Anoxeria due to gastritis is the rule. However, in the early stages, the relief from distress when the stomach has been emptied, produces a desire for food. Thus one must remember that a good appetite does not exclude the possibility of pyloric obstruction.

Loss of Weight.—Wasting is nearly always present, partly on the basis of the secondary gastritis and partly due to the fact that so little food ever reaches the intestine for digestion and absorption. As a result, the physiology of the large and small bowel is upset and constipation of a severe grade is a prominent complaint.

Physical Examination

Evident wasting is present in all patients, the degree of which is dependent upon the length of time that the obstruction has existed. Sometimes the cachexia is more marked in the benign than in the malignant type of stenosis.

The lower abdomen is retracted while the epigastrium is full from the presence of a distended stomach.

Tenderness to deep palpation, with or without a wide area of hyperesthesia over the epigastrium and left half of abdomen is generally present. A succussion splash may be elicited over the distended stomach, provided the hypertrophy of the gastric wall is not excessive, and simple percussion permits fairly accurate outline of the viscus. Occasionally a hypertonic stomach is present and the contracted organ is palpable. In the presence of marked gastric hypertrophy, peristaltic waves may be seen moving from left to right and are accompanied with complaints of pain, followed by emesis of small amounts of mucus and the normal yellowish watery gastric secretion when food has not been taken. Percussing or palpating the abdomen, or having the patient drink a small amount of water will precipitate peristaltic action. Sometimes (variously reported to occur in from 50 to 75 per cent of the cases) a definite tumor may be felt in the region of the pylorus. If benign in nature, the mass is somewhat rounded, firm but not hard, movable and smooth in outline; whereas, a malignant growth is hard, irregular, fixed and less well defined. Confirmatory evidence of the latter may frequently be found by palpation of metastatic growths along the liver border or in the pelvic cul-de-sac.

Pathognomonic symptoms of pyloric obstruction are:

1. Visible peristalsis
2. Pain followed by projectile vomiting.
3. Evidence of retained and fermented food
4. Succussion splash
5. Palpable tumor mass
6. Absence of blood in vomitus and stool
7. Absence of bile in vomitus

Diagnosis and Differential Diagnosis

The diagnosis of idiopathic benign hypertrophic pyloric stenosis may be relatively easy, but in the majority of instances, the diagnostic acumen of the clinician and surgeon are sorely

taxed. According to Toupet and Mouchet,²³ this is impossible even in the operating room. They maintain: "that whatever the clinical picture may be or whatever the appearance of the condition at operation, it is impossible to eliminate the possibility of cancerous infiltration until microscopic examination is made."

A history of long-standing vague gastric dyspepsia, progressive in nature, and characterized by a progressive syndrome of episodic pain, vomiting, retching, loss of weight and constipation, in which the remissions become less frequent and of shorter duration, with each exacerbation becoming more intense and prolonged, should suggest the possibility of this condition.

The differential diagnosis is at all times difficult and not infrequently impossible. However, a careful history and thorough physical examination complemented with adequate laboratory procedures, will in most cases allow the clinician to reach a definite diagnosis.

The most commonly confounded conditions are:

1. *Gastric and Duodenal Ulcer.*—Any chronic ulcer near the pylorus tends toward stenosis. Usually the ulcer is of long standing and thus the patients are frequently past fifty years of age. The actual narrowing is due to a dense fibrosis spreading from the ulcer and surrounding the canal. In others, a penetrating ulcer that becomes adherent to the gallbladder, liver or pancreas, may, by the associated inflammatory reaction and edema, help in narrowing the lumen. Adhesions following this type of condition may, on contraction, draw upwards and kink the pylorus. The stomach usually shows a secondary hypertrophy and dilatation, and gastritis is usual from the concomitant stagnation.

2. *Pyloric Spasm and Simple Fibrosis.*—Pyloric spasm secondary to, and associated with, disturbed physiology or actual pathological changes in the gallbladder, appendix, colon and kidneys, is well known and demonstrable through x-ray and fluoroscopic examination. Walton²⁷ and Oliver¹⁹ seriously doubt that pylorospasm is capable of producing hypertrophy of either the pylorus or of the gastric wall; such changes should be regarded as definite evidence of an organic lesion in the pylorus. McClure¹⁶ suggests the use of atropine sulphate hypodermically to

rule out pylorospasm. Under the fluoroscope the effects of relaxation of the hypertonic muscle is readily visible, and if hypertrophy of the muscle is actual, complete disappearance of the constriction will not occur.

Simple primary fibrosis of the pylorus is a doubtful entity. Most investigators are of the opinion that an ulcer or gastritis is the primary lesion.

3. *Gastric Tumors.*—Any neoplasm at or near the pylorus may lead to obstruction by infiltration of the walls with or without projection into the lumen. Scirrhus carcinoma and a reactive fibrosis may cause a narrowing of the canal identical to that scarring resulting from a gastric ulcer. Usually, however, this thickening and narrowing involves a greater area. A polypoid growth may cause an intermittent type of obstruction through a ball-valve mechanism. Complete obstruction has been reported, wherein the tumor was drawn through the pyloric ring, resulting in an intussusception of the stomach.

4. *Paragastric and Paraduodenal Inflammation.*—Chronic inflammatory changes about the pylorus may result in a secondary constriction. The commonest causes of this phenomenon are cholecystitis and pancreatitis.

5. *Paragastric Carcinoma.*—Carcinoma of the gallbladder, hepatic or transverse portions of the colon, and head of the pancreas may narrow and obstruct the pylorus by compression, actual infiltration, or as the result of the inflammatory reaction.

6. *Kinking of the Pylorus and Duodenum.*—Temporary acute obstruction due to kinking is most common in the presence of a ptotic and mobile stomach. Similarly a ptotic and mobile kidney may draw the duodenum downwards and cause kinking and obstruction, giving rise to one of the varieties of Dietl's crisis. The obstruction generally being acute and temporary in nature, is not followed by hypertrophy of the stomach walls and visible peristalsis. The symptoms occur when the patient is upright and are relieved almost immediately, or, at least, ameliorated by reclining.

7. *Unusual conditions* that have been reported are merely listed:

- (a) Duodenal compression by the superior mesenteric or middle colic arteries in the presence of an exceedingly short mesocolon. Symptoms are present when colon is full.
- (b) Congenital bands—the so-called “primary periduodenal adhesions.”
- (c) Calcified retroperitoneal lymph nodes.

Chronic duodenal obstructions do not produce muscular hypertrophy of the pylorus. Symptoms of an aching epigastric distress with nausea and occasionally emesis, occurring soon after eating and exaggerated by standing or sitting, and relieved by lying prone are pathognomonic of duodenal obstruction. Fluoroscopic examination reveals a dilated duodenum with stasis, exaggerated peristalsis and antiperistalsis. In all cases, regurgitation of the barium into the stomach through a patent pylorus immediately rules out the presence of a pyloric lesion.

Laboratory Procedures

Urinalysis.—There may be a high specific gravity resulting from dehydration.

Blood.—In the presence of a dehydration the hemoglobin, red and white blood cell counts are elevated. A leukocytosis would be, of course, only relative, and the differential count normal in the absence of a coexisting infection. However, an actual leukocytosis is present in severe dehydration.

Sedimentation Rate.—This is not increased.

Blood Wassermann.—The test should be made to rule out neuro- and viscerosyphilis.

Gastric Analysis.—Free hydrochloric acid may be diminished or absent due to the associated gastritis. Free acid will more likely be absent if the obstruction is malignant. Total acidity is increased owing to retention fermentation. Bile salts and blood are absent in the benign type of obstruction. Fractional analysis will show an increase of total acid and retention of starch in all specimens.

Roentgenologic Examination.—The fluoroscopic examination is the most important single procedure in the diagnosis of pyloric obstruction next to the taking of a detailed history. “Spot” roentgenograms are useful for a permanent record of the case. Routine gastric x-rays as taken by the technician are useless.

Numerous “signs” have been discovered and

pronounced by their authors to be pathognomonic for idiopathic benign hypertrophic pyloric stenosis. However, these have not been infallible in many cases, even in the hands of their particular exponents; but nevertheless they have aided in advancing roentgenologic diagnosis of diseases of the stomach and duodenum.

Typical findings show varying degrees of pyloric obstruction with dilatation of the stomach, strong and frequent peristaltic waves, and retention of the motor meal. Peristalsis will appear at varying intervals and may result in esophageal regurgitation.

It is generally conceded that a concentric pyloric defect with an elongated narrow canal and intact mucosal relief establishes the diagnosis.

Golden¹⁰ believes that the demonstration of mucosal folds in the involved area is the most important differential point from the roentgenologist's viewpoint. Hypertrophic changes in the mucosa, even in the presence of marked muscle hypertrophy, are easily discernible, whereas carcinomatous infiltration obliterates these folds. In some cases only one wall may be infiltrated and thus cause confusion. Regressive obliteration of the folds may again serve to cloud the issue.

According to Kirklin and Harris¹¹: “Concentric indentation of the bulbar base in conjunction with prepyloric narrowing is pathognomonic of pyloric hypertrophy.” The base of the normal bulb is flat; the concavity or indentation is believed to be produced by a partial invagination of the hypertrophied muscle into the bulb.

The presence of a patent pylorus indicates a duodenal obstruction. A long irregular canal, with or without filling defects, suggests carcinoma. A well defined defect, niche, or crater indicates ulcer. Very frequently the barium is unable to pass the pyloric ring and enter the canal, and although an obstruction to the stomach outlet is thus evident, the true nature cannot be determined. When this is present, as mentioned previously, atropine administered by injection is invaluable in differentiating between pylorospasm and an organic lesion, as the cause of the obstruction.

Treatment

In the light of our present-day concepts regarding the true cause and nature of the disease, and the reasonable doubt necessarily associated

with the clinical diagnosis thereof, surgery offers the only hope for cure.

Bennett⁵ maintains that medical treatment of pyloric stenosis fails in the majority of cases because it fails to meet the requirements and habits of the individual patient. Quoting: "There is no other disease in which the personal factor is of more importance. It is a mistake to assume that organic narrowing of the pyloric canal, even of high degree, must in all cases be treated surgically." The principal gastric function is to secure liquefaction of food; by which is not meant solution, but a chyme with the consistency of a weak gruel. Therefore, food requiring prolonged gastric digestion must be avoided and a diet with the consistency of chyme substituted. Bennett feels that a regimen as outlined below, plus indicated medicines pushed to the point of saturation or tolerance of each individual patient so as to secure gastric rest, will promote permanent healing and return of health. He advises: gastric lavage in the presence of emesis, dextrose lemonade for from one to two days, followed by diluted milky foods and progressing to a semi-fluid diet for several weeks.

The surgical treatment is undertaken for the purpose of: (1) establishing a definite diagnosis; (2) relieving permanently the obstruction by the simplest, yet adequate, method deemed advisable for that particular case; (3) reestablishing the normal motor and secretory functions of the gastrointestinal tract.

Preoperative and postoperative treatment is of paramount importance, the fundamentals of which are well known. The details alone vary, and are dependent upon the individual surgeon's pet ideas. However, with regards to anesthesia, ether is still considered by the majority of surgeons to be the best and safest anesthetic, and that it should be administered by the open drop method.

In 1912 Rammstedt introduced his well-known operation, which consisted of incising the serosa and muscularis down to the mucosa and spreading to allow the mucosa to gape through the hernia. Since then several modifications have been introduced. Early surgeons performed gastroenterostomy almost exclusively, but since 1912 a pyloroplasty of some form has been the preferred procedure.

The operations that the various surgeons con-

sulted have used in the treatment of this condition are listed below:

1. Pylorodiosis—by Loreta's technic (dilatation through gastrotomy wound) or Hahn's method through the unopened stomach.
2. Pylorodiosis by the Rammstedt technic and its modifications.
3. Nicol pyloroplasty with or without gastrotomy.
4. Finney's operation—lateral or pyloric gastroduodenostomy.
5. Heineke-Mikulicz pyloroplasty.
6. Hemi-resection of anterior portion of pylorus.
7. Posterior gastroenterostomy.
8. Resection of pylorus followed by Polya or Billroth II anastomosis.
9. Gastropylorectomy.

The last two procedures are advocated by the continental surgeons, who base their choice of operation on the claims that only the microscopic examination can rule out the presence of malignancy, and therefore, any procedure that does not allow for this possibility is inadequate.

However, the Rammstedt pylorodiosis and the simpler pyloroplastic technics have stood the test of time and have shown just as great a percentage of cures and certainly a much lower morbidity and mortality rate than have the more extensive procedures. However, the operative results of the Rammstedt operation can be satisfactory only if the entire circular muscle is divided, wide separation and retraction of the divided muscle being entirely of secondary importance. Timely operative interference remains, none the less, the most important prerequisite.

Case Report

A white female, thirty-six years of age, was seen complaining of abdominal distress of eighteen years' duration.

Following an operation for strangulated incisional hernia in 1920, the patient has suffered from episodes of gaseous distention, pyrosis, nausea and abdominal distention lasting from three to four days and occurring at intervals of from four to six weeks, at first relieved by gastric lavage or vomiting.

For the past nine years the symptoms have gradually progressed, with remissions of shorter duration so that at present these "spells" occur every ten to fourteen days, with emesis and pain the predominant symptoms.

The pain in the epigastrium radiates to the left side

and back and vomitus at first contains undigested food and later only mucus and yellow fluid. During the height of the attack the pain and retching are simultaneous and occur without preceding nausea. Bile or blood had never been observed in the vomitus.

She complains of hunger and thirst but has been afraid to eat for fear of precipitating pain and emesis. During this time the patient has been under the care of one clinic and had undergone many and varied examinations. A diagnosis of pyonephrosis was made in May, 1936, and was followed by a right nephrectomy.

Following this she was entirely free of symptoms for about six months, then they recurred in more severe form. At this time she underwent another operation to relieve a "twisted intestine." However, the post-operative course was complicated by epigastric distention, pain and vomiting. Following her discharge from the hospital, examinations failed to locate any cause for her symptoms, and she was finally told that she was "neurotic" and referred to a neurologist and discharged.

The patient was first seen in June, 1938, complaining of pain, vomiting and abdominal distention recurring at intervals of from two to six days. Associated with these symptoms were complaints of frequency, burning pain on urination, nocturia and left lumbar pain.

Examination revealed a well developed but undernourished emotionally unstable adult white female. Gaseous eructations were frequent during the examination. Her face and neck were flushed; the tongue, lips and skin dry. The abdomen was full but not tensely distended; there were no palpable masses, viscerae or herniae noted. Peristaltic waves were not observed and there was no free fluid demonstrable in the abdomen. Borborygmi were present over the entire abdomen, more pronounced in the right lower quadrant. Tenderness was elicited on palpation of the upper half of the low midline scar, and also on light Murphy percussion of the left flank. There were healed lower midline, right mid-transrectus and right lumbar incisional scars.

The patient's temperature was 99°, pulse 88, blood pressure 160/100. Urinalysis was normal save for an occasional red blood cell.

The tentative diagnoses were: (1) chronic high intestinal obstruction; (2) essential hypertension; (3) possible left upper urinary tract lesion.

In view of her past history, a urologic study was deemed advisable before considering abdominal section. Cystoscopic examination followed by retrograde pyelography (left), excretion urography, and renal function tests were negative except for absence of the right kidney. However, the x-ray films showed several loops of ileum and stomach distended with gas.

The following day the patient felt considerably improved and asked to be released for a few days before submitting to operation. She was readmitted to the hospital on July 10, 1938, acutely ill and complaining of constipation, abdominal pain and distention, repeated emesis and retching, of twelve hours' duration. Her temperature at this time was 98°, pulse 100, blood pres-

sure 122/84, urinalysis negative and white blood count 11,650.

Continuous gastric siphonage was instituted and par-enteral fluids administered. Retching continued, finally becoming almost continuous after a period of six hours, in spite of siphonage. At this time visible peristaltic waves were observed in the epigastrium, traveling from left to right. The entire abdomen was tympanitic to percussion, generally tender, but more so over the upper half. No masses were palpable. Borborygmi were general over the entire abdomen, and a high-pitched whistling sound was heard just below and to the left of the umbilicus.

Flatus was passed occasionally and colon flushing only added to the patient's distress. The temperature rose to 100° and pulse rate gradually increased.

A diagnosis of acute and chronic intestinal obstruction with associated duodenal obstruction was followed by an exploratory laparotomy. The abdomen was opened through the old right transrectus scar, and exploration revealed an incomplete obstruction of the ileum about five feet above the ileo-cecal juncture, due to an incarcerated Richter's hernia at the upper angle of the old midline incisional scar. This was reduced and the hernia repaired by the intra-abdominal approach, and the intestinal pouch invaginated. The stomach was distended with gas, the walls thickened and edematous, and the pylorus completely obstructed by a typical circular muscle hypertrophy. This was relieved by the Rammstedt method and the incision covered by the transverse approximation of the serosa. The small bowel distention, in the meantime, had decreased considerably and flatus and liquid stool was escaping from the rectal tube.

The postoperative course was extremely uneventful. Oral fluids were taken as soon as the patient recovered from the anesthetic, and food was allowed the following morning. The patient was discharged, as improved, on the twelfth postoperative day. Subsequent office examinations have confirmed complete recovery. In a letter received in December, 1938, the patient states that for the first time in nine years she has been completely free of abdominal distress and is able to eat any and all varieties of food with impunity.

This case has been presented since it rather fully reiterates the points previously reviewed. In addition, the associated Richter's hernia and partial intestinal obstruction added to the confusion of an already difficult diagnostic problem. The question of x-ray investigation of the stomach and duodenum has no doubt already been raised. This examination had been performed, and found negative, by a competent radiologist within a period of three months prior to her first visit at this clinic; and in addition, such an examination was impossible at the time of her second admission, due to the almost continuous

vomiting, even in the presence of an automatic gastric suction apparatus.

Bibliography

- Appelmans, R., Van Goodenoven, F., and Boine, J.: *Belgian Med. Sc. Rev.*, 1:1, 1930.
- Archer, V. W.: *Hypertrophic pyloric stenosis in adults. Amer. Jour. Roentgenol.*, 23:510, 1930.
- Bassler, Anthony: *Sajous Encyclopedia*. Vol. 8, p. 395.
- Bell, E. T.: *Text Book of Pathology*. Philadelphia: Lea and Febiger, 1938.
- Bennett, T. J.: *Non-malignant pyloric stenosis. Lancet*, 1:552, 1937.
- Cunha, F.: *Idiopathic benign hypertrophic pyloritis. Am. Jour. Surg.*, 33:21, 1936.
- Deaver, J. B.: *Pyloric obstruction. Am. Jour. Surg.*, 6: 621, 1929.
- Donati, G. S.: *Ann. Ital. Surg.*, 14:1145, 1935.
- Eusterman, G. B., and Balfour, D. C.: *The Stomach and Duodenum*. Philadelphia: W. B. Saunders Co., 1936.
- Golden, Ross: *Antral gastritis and spasm. Jour. A.M.A.*, 109:1497, (Nov. 6) 1937.
- Horton, B. T.: *Pyloric block, with special reference to the musculature, myenteric plexus and lymphatic vessels. Arch. Surg.*, 22:438, (March) 1931.
- Judd, E. S., and Thompson, H. L.: *Hypertrophic stenosis of the pylorus in adults. Surg. Clin. No. America*, 13:801, (Aug.) 1933.
- Kirklin, B. R., and Harris, M. T.: *Hypertrophy of the pyloric muscle of adults; a distinctive roentgenologic sign. Am. Jour. Roentgenol. and Radium Therapy.*, 29:437, (April) 1933.
- Knauer, H.: *Sajous Supplement*, 17:480, 1938.
- Lamson, O. F.: *Surg., Gynec. and Obst.*, 57:398, 1933.
- McClure, C. C.: *Hypertrophy of pyloric muscle in adults. Surg., Gynec. and Obst.*, 52:945, (May) 1931.
- McNamee, E. P.: *Pyloric stenosis with hypertrophy of pyloric muscle in adults. Am. Jour. Roent. & Rad. Therapy*, 29:24, (Jan.) 1933.
- Morton, C. B.: *Hypertonicity with hypertrophy of the pylorus in adults. Arch. Surg.*, 20:508, 1930.
- Oliver, J. C.: *Congenital hypertrophic stenosis in the adult. Ann. Surg.*, 76:444, 1922.
- Penick, R. M.: *Ann. Surg.*, 96:219, 1932.
- Rossie, R.: *Hypertrophy of the pylorus in adults. Schweiz. med. Wchnschr.*, 65:174-176, (Feb. 23) 1935. *Abstract Int. Surg. Dig.*, 27:273, 1935.
- Savarese, E.: *True muscular pyloric hypertrophy of the adult. Arch. ital. di chir.*, 45:559, 1937.
- Toupet, R., and Mouchet, A.: *Considerations on benign hypertrophic pyloric stenosis in the adult. Jour. de Chir.*, 50:1, 1937.
- Turner, G. G.: *Pyloroplasty. Surg., Gynec. and Obst.*, 14:537, 1912.
- Twining, E. W.: *Brit. Jour. Radiol.*, 6:644, 1933.
- Walton, A. James: *Nelson's Surgery Service*. (Nov.) 1928, page 319.
- Walton, A. J.: *Nelson Living Surgery*, Vol. 5, pp. 68-72.
- Walton, A. James: *Nelson Living Surgery: Survey of Current Literature*, pp. 192-193 (May) 1932.

PSORIASIS*

A Clinical and Laboratory Statistical Study

JOHN F. MADDEN, M.D.
Saint Paul, Minnesota

PSORIASIS is one of the more common skin diseases. However, very little is known about it except its clinical appearance and histopathology. This statistical study helps to evaluate certain allegations regarding psoriasis and shows some facts concerning the disease. There were forty-four cases examined. Of this number twenty-eight were females and sixteen males. The average age was thirty-six years. The youngest patient was four years of age and the oldest eighty-two.

Onset and Duration.—The average age at onset was twenty-six years. The disease does not seem to appear at any definite time of the year. The onset was in the fall in nine cases, in the winter in nine, in the spring in eight, in the summer in thirteen, and five patients did not remember when the disease began. Psoriasis had been present for fifty-three years in one case and only three months in one instance. The average duration was twelve years.

Remissions and Seasonal Variations.—In thirty-two cases, 73 per cent, the patients were

never entirely free from psoriasis. Complete single remissions occurred in six cases during the summer when the patients took frequent sun baths. One patient did not have any lesions for four years, and two for one year. Pregnancy, rheumatic fever, and arsenic pills were given as the cause of remissions in single cases. No seasonal variation was noticed by twenty-one patients, twenty-two patients thought that the disease was better during the summer, and one patient stated that the eruption improved during the winter. Most of the cases went through cycles of remissions and exacerbations of varying lengths.

Types of Lesions and Regions Involved.—Various sized circinate and gyrate patches were found in thirty cases, small punctate or guttate papules were found in twenty cases, and large infiltrated plaques were observed in eleven cases. In some patients only one type of lesion was present, but in most cases several types were noted. The scalp was involved in thirty-five patients, the arms in thirty-two, the trunk in thirty, the legs in thirty, the face in twenty-one, the dorsum of the hands in thirteen, the external

*From the Ancker Hospital, Saint Paul and the Division of Dermatology and Syphilology, University of Minnesota. Dr. H. E. Michelson, Director.

genitalia in ten, the nails in eight, the gluteal cleft and perianal region in four, and the palms and soles in one case. The appearance of lesions on the face in 48 per cent of this series seems high because one usually thinks of psoriasis occurring on the covered portions of the body. The scalp was attacked with greater frequency, 79 per cent, than any other location.

Symptoms.—Itching was severe in ten cases and moderate or slight in nineteen cases. The pruritus was most marked in those patients who had lesions in the scalp and was intensified during exacerbations when new papules appeared. Painful and bleeding fissures were noted in three cases. One patient complained of severe burning sensations in the palmar and plantar lesions. No subjective symptoms were present in eleven cases. All the patients were embarrassed by the disease. Most psoriatics would not wear bathing suits nor would they attend social gatherings if the eruption was present on the face. The women often wore long sleeved dresses the year round in order to hide the lesions. Psoriasis cannot be considered an asymptomatic disease when thirty-three patients, 75 per cent, in this series had definite disturbing symptoms and all suffered some mental anxiety because of the disease. These figures and most of the others throughout this clinical statistical study agreed with those of Lane and Crawford.²

Changes in Body Weight.—A gradual gain or no appreciable change in weight was noted by thirty-one patients. A loss of weight caused by diet or manual labor of 7 pounds in three weeks, 14 pounds in three months, 25 pounds in six months, 26 pounds in four months, 30 pounds in two years, and 50 pounds in one year caused no change in the eruption in six cases. While on a reduction diet two patients lost 35 and 50 pounds in six months and the eruption was reduced to a few scattered papules. New lesions appeared as soon as the patients abandoned the diet and began to gain weight. A gain in weight of 30 pounds in two years, 30 pounds in five years, 35 pounds in six months, 40 pounds in eighteen months, and 40 pounds in five years was accompanied by a marked increase in the psoriatic eruption in five patients. In the eight patients showing an abnormal loss of body weight no appreciable effect on the psoriasis was observed

by six patients. While marked loss of weight had little effect on psoriasis an abnormal gain in weight seemed to make the disease much worse.

Intercurrent Diseases.—In thirty-one patients no intercurrent diseases except arthritis, rheumatic fever, or foci of infection were noted. These diseases will be considered later. Measles in two cases, pleurisy in two cases, and parotiditis, quinsy, pertussis, central nervous system syphilis, cholelithiasis, septic abortion, hypertrophied prostate with cystitis, lung abscess, and syphilitic hepatitis in single cases had no noticeable effect on the patients' psoriasis. The eruption became much worse during an attack of nephrolithiasis in one case and cholelithiasis in another. One patient stated that the disease almost disappeared while he was receiving therapeutic malaria for syphilis. The above intercurrent diseases had only a transitory effect on psoriasis in three patients and no effect on the remainder.

Pregnancy.—Pregnancy occurred thirty times in eight patients. No change was noted in the psoriasis during fifteen pregnancies. In fourteen pregnancies the psoriasis almost disappeared. One patient stated that the first lesions recurred on the nipples after she had been nursing her baby for about five months. The lesions usually began to disappear at the end of the first trimester and the disease steadily improved during the remaining months of pregnancy. If a patient's psoriasis improved or showed no change during her first pregnancy a similar experience was observed in succeeding pregnancies.

Arthritis.—Arthritis appeared at some time during the presence of psoriasis in eleven cases (25 per cent). Arthritis did not immediately precede, accompany, or follow psoriasis in any case. Acute arthritis with fever which lasted three or four weeks in five cases, chronic arthritis of two to fifteen years duration in four cases, and acute arthritis with fever followed by chronic arthritis in a single case had no noticeable effect on the eruption. One patient with chronic arthritis and psoriasis stated that both diseases had exacerbations and remissions simultaneously. Although arthritis was observed in 25 per cent of this group of psoriatics, ten of

the eleven patients could not see any direct relationship between the signs or symptoms of either disease.

Menstruation.—Twenty patients in this group were subject to menstruation. No change in the psoriasis was seen during the menstrual period in thirteen cases. The lesions became more erythematous, the itching was more severe, or the scale was more noticeable three or four days before or during the menstrual period in seven cases. Menstruation temporarily aggravated the signs or symptoms of psoriasis in 35 per cent of this series.

Foci of Infection.—Definite foci of infection were discovered in twenty-three patients (52 per cent). Nine patients had abscessed teeth, eight had chronic tonsillitis, four had chronic prostatitis, four had cervicitis and cervical erosions, and three had chronic sinusitis. These foci of infection were removed or treated until the infection could no longer be detected, but there was no change noted in the psoriasis.

Familial Incidence.—The patients had ninety-one brothers and ninety-five sisters. Of this number six sisters had psoriasis, but these occurred in two families. One female patient's mother and two sisters had the disease while two brothers and four children were not affected. Another unmarried female patient's father and four sisters had psoriasis while three brothers and two sisters were free from the eruption. The rest of the parents did not have psoriasis. A paternal uncle and a maternal aunt and uncle had the eruption in two instances. As far as could be determined the grandparents were not affected. The children, thirty-eight girls and twenty-nine boys, did not have psoriasis. Psoriatic families were striking when found, but they were very rare in this group (only 4 per cent).

Previous Treatment.—Only two patients had not been treated before they were seen in our clinics. Most patients went from place to place receiving several of the therapeutic measures listed below while some became discouraged when the first agent did not cause prompt disappearance of the eruption. The following remedies were temporarily beneficial: ointments

containing ammoniated mercury, sulphur, salicylic acid, or unknown ingredients in eighteen cases; arsenic compounds taken by mouth or given intramuscularly in ten cases; ultraviolet light in four cases; x-rays in three cases; proprietary medicine by mouth in two cases; sun baths in two cases; and ultraviolet light combined with tar ointment, frequent baths, scrubbing with green soap, milk injections, typhoid vaccine, proprietary ointment, Kettering hypertherm, and a reduction diet in single cases. The following remedies were of no benefit: ointments containing ammoniated mercury, sulphur, salicylic acid, or unknown ingredients in twenty cases; arsenic compounds given by mouth or intramuscularly in nine cases; autohemotherapy in four cases; ultraviolet light in two cases; and milk injections, proprietary ointment, proprietary medicine by mouth, x-rays, thyroid extract, and acriflavine injections in single cases. A tar salve and arsenic given by mouth were said to have been the cause of acute exfoliative dermatitis in single cases. In this group of psoriatics the above remedies were of no benefit or gave only temporary relief in the cases in which they were used.

Laboratory Statistical Study

Many laboratory tests were done on the patients to determine whether or not abnormalities existed.

Erythrocytes.—In forty patients the erythrocytes varied from 3,750,000 to 5,500,000 per cubic millimeter of blood. Only eight patients showed red corpuscles below 4,000,000 per cubic millimeter of blood.

Leukocytes.—The leukocytes ranged from 5,000 to 10,800 per cubic millimeter of blood in forty patients.

Differential Leukocyte Count.—The differential leukocyte count was normal in all forty patients.

Hemoglobin.—The hemoglobin was between 70 and 100 per cent in forty patients. Eight cases showed hemoglobins below 80 per cent.

Blood-platelets.—The blood-platelets varied from 150,000 to 380,000 per cubic millimeter of blood in twenty-one patients. They were under 175,000 per cubic millimeter of blood in three instances.

Bleeding Time.—The bleeding time varied

TABLE I

Number of cases	Degrees of free hydrochloric acid	Degrees of total acid
1	12	22
2	0	0
3	5	27
4	28	38
5	37	66
6	33	58
7	58	98
8	12	20
9	0	6
10	51	83
11	0	12
12	12	20
13	42	71
14	32	72
15	0	20
16	38	72
17	0	10
18	8	28
19	45	67
20	11	27
21	6	29
22	16	41
23	0	8
24	35	85
25	0	22
26	0	0
27	14	28
28	34	52

from one minute to three minutes 30 seconds in twenty-eight patients.

Coagulation Time.—Coagulation took place from one minute 30 seconds to six minutes in twenty-six cases. Two patients had coagulation times of eight and nine minutes.

Icterus Index.—The icterus index was from 4 to 12 in thirty patients. Only three had readings below 6.

Blood Calcium.—The calcium content of the blood serum varied between 8.3 and 13.2 milligrams for each 100 c.c. in twenty-nine patients. Two had below 9 and one over 11 milligrams of calcium for each 100 c.c. of blood-serum.

Urea-nitrogen.—The urea-nitrogen ranged from 13.3 to 21 milligrams per 100 c.c. of blood in twenty-seven instances.

Creatinin.—The creatinin varied from .88 to 1.6 milligrams per 100 c.c. of blood in twenty six patients.

Gastric Contents.—The gastric contents were normal except the amounts of free hydrochloric acid and total acid. The normal figures for gastric acidity are from 25 to 50 degrees of free hydrochloric acid, and from 50 to 80 degrees of total acid. Table I shows the findings in twenty-eight cases.

Free hydrochloric acid was entirely absent or below normal limits in seventeen patients (61 per cent). Total acid was absent or below normal in eighteen (64 per cent). Ayres¹ found a low free hydrochloric acid and low total acid in 52 per cent of his patients. The degree of acid in the gastric secretion did not indicate how the psoriatics would respond on a low fat diet.

Urine.—Albumin, sugar, and casts were not found in specimens from thirty-nine patients. The urine of the patient who had the hypertrophied prostate gland and cystitis showed albumin, casts, and leukocytes.

Basal Metabolism.—The basal metabolic rate varied from minus 12 per cent to plus 16 per cent in twenty-three patients.

Widal Test.—The Widal test was negative in twenty-one cases.

Wassermann Test.—The blood Wassermann reaction was negative in forty-two patients and positive in the two known to have syphilis.

Sedimentation Rate.—The sedimentation rate of the red corpuscles during the first hour was 2 to 18 millimeters for fourteen females, 25 millimeters for one female, and 8, 5, 24, and 33 millimeters respectively for four males.

Mantoux Test.—The Mantoux tuberculin test was negative in fifteen patients and positive in one.

Blood Groups.—Fourteen patients were in group 4, thirteen in group 2, and three in group 3.

Blood Sugar.—The fasting blood sugar ranged from 78 to 130 milligrams per cent in twenty-five patients. Three patients, aged 62, 65, and 74, showed fasting blood sugars of 180, 182, and 160 milligrams per cent. These figures are high even in elderly individuals.

Uric Acid.—The blood of twenty patients (91 per cent of the cases) contained 2 to 4 milligrams per cent of uric acid. The blood of two patients showed 6 and 8 milligrams per cent. The observations of LeCoultré³ that all psoriatics showed an abnormal increase in the uric acid in the blood could not be substantiated.

Summary and Conclusions

1. Psoriasis does not seem to appear at any definite season of the year.
2. Complete remissions are very rare. The disease is cyclic and the patients usually are better during the summer.

3. Itching is a common and distressing symptom in psoriasis. In this series 75 per cent of the patients had disturbing symptoms.

4. Marked loss of body weight had little effect on psoriasis, but an abnormal gain in weight seemed to make the disease much worse.

5. Intercurrent diseases have transitory or no effect on psoriasis.

6. Pregnancy had no effect or only temporarily benefited psoriasis.

7. There was no direct relationship between psoriasis and arthritis in this series.

8. Menstruation temporarily aggravated the signs and symptoms of psoriasis in 35 per cent of this series.

9. The removal or treatment of foci of infection had no noticeable effect on psoriasis.

10. The existence of psoriatic families was striking, but their occurrence was very rare in this group.

11. Treatment which was of benefit in about half of the cases was of no benefit in a like number.

12. Many laboratory tests were done. The gastric contents showed the only abnormality. Free hydrochloric acid was entirely absent or below normal limits in seventeen patients (61 per cent). Total acid was absent or below normal in eighteen (64 per cent).

Bibliography

1. Ayres, Samuel: Gastric secretion in psoriasis, eczema and dermatitis herpetiformis. *Arch. of dermat. and syphil.*, 20:854, (December) 1929.
2. Lane, C. G. and Crawford, G. M. Psoriasis. *Arch. of dermat. and syphil.*, 35:1051, (June) 1937.
3. LeCoultré, L.: Ueber die Bedeutung der Harnsäure in der Aetiologie der Psoriasis. *Arch. f. Dermat. u. Syph.*, 174:650-655, 1936.

FURTHER STUDIES IN THE USE OF QUINIDINE IN THE TREATMENT OF CARDIAC IRREGULARITIES*

S. A. WEISMAN, M.D.
Minneapolis, Minnesota

IN 1936 I presented a report on a five-year follow-up study on the ambulatory treatment of auricular fibrillation with quinidine.³ In discussing the treatment it was pointed out that, in order to get the most effective results, quinidine should be given in small doses to start with, slowly increasing the amounts daily, and that these small amounts should be given at frequent intervals. By this method the patient is more apt to establish a tolerance for quinidine and also to avoid the toxic effects that are so often attributed to its use. Since that time I have been engaged in the study of the excretion time of quinidine from the blood and from the various organs of the body to determine how rapidly the drug is eliminated after it has been given intravenously or orally. It is the purpose of this presentation to give a preliminary report of these findings and to present an eight-year follow-up

study of the ambulatory treatment of auricular fibrillation and the method used.

Dogs weighing about twenty kilograms were mainly used in our animal experiments. A few rabbits were also used. Amounts of quinidine up to 600 milligrams were given intravenously to these animals, and samples of the blood were taken at intervals of five minutes or more after the injection (Table I). It was found that the drug was eliminated from the blood stream very rapidly. Less than 6 per cent of the quinidine was found in the blood samples taken seven minutes after the drug was injected intravenously. Repeated samples of the blood taken for several hours after did not reveal any trace of the drug. These findings are in accord with those of Weiss and Hatcher.² Working with cats, they showed that 95 per cent of quinidine given intravenously was eliminated from the blood in about five minutes. Hatcher and Gold¹ examined the blood of three patients who were given 650 milligrams of quinin (an isomer of quinidine) intravenously. Samples of blood were taken six to twenty minutes after the injection. They state

*From the Department of Medicine and the Department of Pharmacology, University of Minnesota. Presented before the Southern Minnesota Medical Association, Rochester, Minnesota, September 29, 1938.

This work was carried on with the aid of a grant from the Graduate School, University of Minnesota. Assistance in the preparation of these materials was furnished by the personnel of Works Progress Administration Official Project No. 665-71-3-69.

CARDIAC IRREGULARITIES—WEISMAN

TABLE I. CONCENTRATION OF QUINIDINE IN THE BLOOD (OF ANIMALS)

Animal	Sex	Weight (Kilos)	Intravenous Dose (Mg.)	Time Con- sumed for In- jection (Minutes)	Time Intervals at which Sam- ples Were Taken		Mg. "Q" H ₂ SO ₄ per c.c. Blood	Per Cent Q in Blood
					Hrs.	Mins.		
Rabbit	M	3.225	90	3.5		7	0.00	0
						15	0.00	0
Dog 1	M	23.0	500	6.0		5	0.00	0
						30	0.00	0
					1	00	0.00	0
					2	00	0.00	0
					4	00	0.00	0
Dog 1	M	23.0	500	5.0		5	0.00	0
						10	0.00	0
						24	0.00	0
Dog 1	M	23.0	600	2.0		7	0.0196	5.7
						15	0.00	0
Dog 2	M	8.6	240	2.5		7	0.0186	5.0
						12	0.00	0
						15	0.00	0
						30	0.00	0
					1	00	0.00	0
					2	00	0.00	0
Dog 1	M	23.0	600	4.0		7	0.0196	5.7
						15	0.00	0
						30	0.00	0

Note: Controls run by the Bromate-Bromide method repeatedly resulted in zero.

that "none of the three contained more than a fraction of a milligram, showing that much of the greater part of the quinid injected had left the circulation."

Since quinidine is usually given orally in the treatment of cardiac disturbances in rhythm, especially in auricular fibrillation, it was believed desirable that a study of the excretion time of quinidine from the blood be made after the drug was given by mouth. This study was carried out mostly on patients. Two groups of patients were used. In the first group, each patient was given a single dose of quinidine. In the second group, each patient was given quinidine in repeated doses one hour apart. It was the purpose of this experiment to see if there was any difference in the excretion time of the drug in the two groups. Were there any accumulative effects when quinidine was given in repeated doses at short intervals?

Eight patients were given single doses of quinidine in amounts up to 10 grains. Examinations of the blood taken thirty minutes after administration of the quinidine showed that less than 10 per cent of the drug was left in the blood. Samples of the blood taken one hour after ingestion of the drug showed no evidence

of quinidine. In other words, after giving quinidine by mouth in single doses, over 90 per cent of the drug had left the blood in thirty minutes, and practically all of the quinidine was eliminated from the blood at the end of one hour (Table II).

Six patients were given from 3 to 10 grain doses of quinidine at one-hour intervals, amounting to a total of ten to thirty grains for each patient (Table III). Samples of blood taken one half-hour after the last dose showed that on the average about 20 per cent of the drug was present in the blood. At the end of one hour about twice as much quinidine was present in the blood as there was at the end of the first half-hour. However, ninety minutes later—that is, one and one-half hours after the ingestion of the drug—no quinidine was found in the blood. This shows that (Fig. 1) when the drug is given in repeated doses at short intervals, there appears to be an accumulative effect, or the excretion time of the drug is delayed. The height of concentration of the drug in the blood is reached in thirty minutes or less after a single dose is given, but when the quinidine is given in repeated doses at short intervals of one hour, the point of maximum concentration of the drug in

CARDIAC IRREGULARITIES—WEISMAN

TABLE II. CONCENTRATION OF QUINIDINE IN BLOOD (OF HUMANS)
(Giving single doses orally)

Name	Sex	Age	Weight (Kilos)	Amount Given (in tablets)	Time Blood Taken After Last Dose Hrs. Mins.	Mlg. "Q" c.c. Blood	Per Cent "Q" in Blood	Remarks
GW	M	67	61.3	5 gr.	30	0.0055	8.0	Normal
					1 00	0.0000	.0	
					1 30	0.0000	.0	
B	M	45	80.5	5 gr.	30	0.00524	10.0	Normal
					1 00	0.00000	.0	
					1 30	0.00000	.0	
G	M	45	76.7	5 gr.	30	0.00442	8.0	Fibril- lating
					1 00	0.00000	.0	
					1 30		.0	
D	F	52	65.9	5 gr.	30	0.00525	8.13	Normal
					1 00	0.00000	.0	
W	F	17	61.3	5 gr.	30	0.0066	9.7	Normal
					1 00	0.0000	.0	
C	F	23	42.3	5 gr.	30	0.00748	7.5	Normal
					1 00	0.00000	.0	
C	F	57	56.8	5 gr.	30	0.0070	10.0	Normal
					1 00	0.0000	.0	
OV	M	60	72.2	10 gr.	30		7.1	Normal
					1 00		.0	
					1 30		.0	
					2 00		.0	
					2 30		.0	
					3 00		.0	
					3 30		.0	
					4 00		.0	
					4 30		.0	
					5 00		.0	
					5 30		.0	
					6 00		.0	
					6 30		.0	

TABLE III. CONCENTRATION OF QUINIDINE IN BLOOD (OF HUMANS)
(Giving repeated doses orally)

Patient	Age	Weight (Kilos)	Amount of Dose (given orally in tablets)	Time Blood Taken After Last Dose Hrs. Mins.	Mlg. "Q" c.c.	% "Q" in Blood	Disease
Mr. O.	60	75.4	2-5 gr. doses 1 hr. apart (Tot. 10 gr.)	30	0.0125	11.0	Coronary; heart regular
				1 00	0.0045	4.0	
				1 30	0.0000	.0	
Mr. F.	56	82.2	2-5 gr. doses 1 hr. apart (Tot. 10 gr.)	30	0.0208	20.0	Coronary; fibrillating
				1 00	0.0500	48.2	
				1 30	0.0000	.0	
Mr. F.	56	82.2	3-5 gr. doses 1 hr. apart (Tot. 15 gr.)	30	0.0266	17.0	Coronary; fibrillating
				1 00	0.0700	45.0	
				1 30	0.0000	.0	
Mr. C.	68	87.7	3-5 gr. doses 1 hr. apart (Tot. 15 gr.)	30	0.0260	17.8	Coronary; fibrillating slight decompensation
				1 00	0.0560	46.4	
				1 30	0.0000	.0	
				2 00		.0	
Mr. W. C.	46	85.0	4-3 gr. doses 1 hr. apart (Tot. 12 gr.) (780 mgm.)	30	0.0260	21.5	Coronary; fibrillating
				1 00	0.0609	50.4	
				1 30	0.0000	.0	
				2 00		.0	
Mrs. F.	52	56.8	3-10 gr. doses 1 hr. apart (Tot. 30 gr.)	30	0.0982	22.0	Hyperthyroid; fibrillating
				1 00	0.2164	48.4	
				2 00		.0	

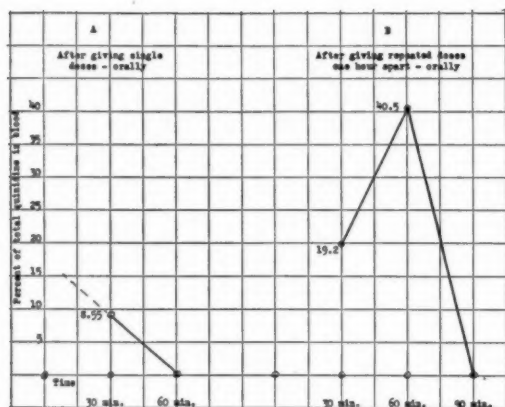


Fig. 1. Concentration of quinidine in blood (human).

the blood stream is reached in sixty minutes or less after the last dose is given.

We believe the error in carrying out this work is not great. We used a burette devised by Dr. A. D. Hirschfelder of the Department of Pharmacology, whereby quantities of quinidine as small as 0.0005 of a milligram can be determined.

This study suggests that it is perhaps better to give frequent small doses for a more favorable result. When this is done, there appears to be a more gradual increase in the concentration of the drug in the blood and also a more gradual elimination of the drug from the blood. It is perhaps for this reason that in our experience very few patients have complained of any toxic effects.

I started out by saying that in 1935 I gave a five-year follow-up study on the ambulatory treatment of auricular fibrillation with quinidine. I shall now give an eight-year follow-up study.

To date Mr. Or, Mrs. M., and Mrs. G., three patients who were in the group of seventeen cases reported in 1932,⁴ are still regular. Mr. Or and Mrs. M. have now been regular for seven years, and Mrs. G. has now been regular for eight years (Table IV). Mr. B. died last year following on operation upon an aneurism of the popliteal artery. He had been regular for six years. I have lost track of Mr. P., who in 1937 had been regular for six years. These last two cases were reported as regular in 1936.

The three cases heretofore mentioned are very grateful for their marked improvement since their hearts have been beating regularly. They were more or less invalids for periods of six months to three years before starting treat-

ment. For the past seven years in two cases and eight years in one case, these individuals have been self-supporting and useful citizens. They have reported diligently almost every month for a check-up. They have been taking digitalis and quinidine all this time. As I said before, I believe that if more of the cases originally reported could have been followed up as closely as these three, I have no doubt that I should have had a larger number who would still be regular.

I believe the method that we use in giving quinidine is very important for two reasons: (1) the patient is more apt to establish a tolerance for the drug; and (2) the method tends to eliminate the toxic symptoms we hear so much about that are attributed to quinidine.

Two things should be kept in mind. First, begin with small doses, and, second, repeat doses at short intervals. Our clinical experience with some 200 cases, treated in the cardiac clinic at the University of Minnesota, leads us to believe that quinidine is a very valuable and effective drug in the treatment of this disease. We believe that quinidine should be given in small doses to start with and the dose increased daily and very slowly. In repeating the dose of quinidine, give it at one-hour intervals until the total amount desired is given, then quit for that day. Another very important point is first to digitalize the patient. The heart rate must be slowed down to about 80-70 before starting the use of quinidine. After the heart rate has slowed down, keep the patient on a maintenance dose of digitalis (usually one U.S.P. cat unit) all the time during the treatment with quinidine.

I will again repeat the method we use in giving quinidine in ambulatory cases for the treatment of auricular fibrillation. Give as follows: first day, one dose of 1.5 grains (0.1) at 8 A.M.; second day, 1.5 grains (0.1) at 8 A.M. and at 9 A.M. Then continue as shown in Table V.

If the heart has not returned to regular rhythm after giving thirty grains of quinidine for a few days, I discontinue its use. I have found that, if it takes much more than thirty grains to restore normal rhythm, it is very difficult to maintain a normal rhythm.

After the heart is restored to normal rhythm, gradually cut down the dose of quinidine, say about five grains daily until the patient gets about fifteen grains a day. The maintenance dose can

CARDIAC IRREGULARITIES—WEISMAN

TABLE IV

Name	Etiology	Age	Duration of Fibrillation	Regular
Mrs. Or.	Coronary	60	6 months	7 years
Mrs. M.	Rheumatic	53	3 years	7 years
Mrs. G.	Hypertension and Coronary	70	2 years	8 years

TABLE V. METHOD OF GIVING QUINIDINE

Day	Time of Dose			
	8 A. M.	9 A. M.	10 A. M.	11 A. M.
1	0.1 (1½ grain)			
2	0.1	0.1		
3	0.1	0.1	0.1	
4	0.1	0.1	0.1	0.1
5	0.2 (3 grains)	0.2	0.2	
6	0.2	0.2	0.2	0.2
7	0.33 (5 grains)	0.33	0.33	
8	0.33	0.33	0.33	0.33
9	0.33	0.67 (10 grains)	0.67	
10	0.67	0.67	0.67	

be ten grains or even five grains in some cases. Usually five grains for two doses one hour apart is the average maintenance dose. This maintenance dose can be kept up indefinitely, together with digitalis.

Conclusions

1. About 95 per cent of the quinidine given intravenously leaves the blood in about seven minutes or less. When quinidine is given intravenously (to dogs), less than 6 per cent of the drug remains in the blood at the end of seven minutes.

2. Quinidine given by mouth in single doses reaches its maximum concentration in the blood in thirty minutes or less and leaves the blood before one hour.

3. When quinidine is given orally in repeated doses, it reaches its maximum concentration in the blood in one hour or less and is all eliminated in one and one-half hours.

4. It appears that quinidine is accumulative

in the blood when given in repeated doses one hour apart.

5. An eight-year follow-up study on the ambulatory treatment of auricular fibrillation is presented.

6. Our method of treating auricular fibrillation with quinidine is again presented.

I wish to express my appreciation to Dr. A. D. Hirschfelder of the Department of Pharmacology for his valuable suggestions and aid in carrying out the chemical procedures for the quantitative analysis of quinidine in the blood and tissues. The method used will soon be published elsewhere.

References

1. Hatcher, R. A., and Gold, H.: Studies on quinin. *Jour. Pharm. and Exp. Ther.*, 30:347-350, 1927.
2. Weis, Soma, and Hatcher, R. A.: Studies on quinidine. *Jour. Pharm. and Exp. Ther.*, 30:335-345, 1927.
3. Weisman, S. A.: The ambulatory treatment of auricular fibrillation with quinidine. *Minn. Med.*, 19:349, 1936.
4. Weisman, S. A.: Auricular fibrillation—Ambulatory treatment with quinidine. *Arch. Int. Med.*, 49:728-734, (May) 1932.

POWERS AND DUTIES OF TOWNSHIP BOARDS OF HEALTH IN MINNESOTA

O. C. PIERSON, Director

Division of Administration, Minnesota State Board of Health
Saint Paul, Minnesota

VARIOUS governmental divisions and forms of local government are provided for by the Minnesota statutes. The governing body of a county is the Board of County Commissioners. The governing bodies of cities and villages are the local councils, and for a town the board of supervisors. The statutes provide for local boards of health under each of these divisions of the local government. County boards of health are appointed by the boards of County Commissioners. City and village boards of health are appointed by city and village councils. The town board of supervisors itself, according to the statutes, must also serve as a board of health for the town, and in effect therefore acts as two separate and distinct boards composed of the same personnel, one board being the general governing body of the town, and the other the town board of health. The powers and duties of the governing bodies and of the boards of health for each of these governmental divisions are prescribed by the statutes.

When a question of public health procedure arises within a town, the town board must determine what the laws and regulations provide for such procedure. If its duty in the matter is found in the laws or regulations pertaining to the duties of local boards of health, then the board acts in that matter as a board of health, just as a city or village board of health would be required to act in a city or village. If its duty lies in the laws pertaining to the powers and duties of town boards of supervisors, then it should act as the board of supervisors and not as the board of health. The State health authorities are not qualified to advise members of boards of supervisors as to their duties as members of such boards. But they are qualified to advise them as to their duties as members of town boards of health.

There is one particular difference between the organization and duties of town boards of health and of city and village boards of health. The statutes say that one member of a city or village board of health must be a physician, who shall

be the health officer of the city or village and the executive of the local board of health. Another part of the statutes says that if no member of the town board is a physician, the town board shall appoint a physician as health officer for the town. Another part of the statutes says that all local health officers shall enforce all health laws and regulations and obey the directions of the State Board of Health in the control of communicable diseases. But still another part of the statutes says that for towns the chairman of the town board shall see to it that all necessary things are done to control communicable disease and to enforce the state health laws and regulations. This last provision seems to be contradictory or inconsistent with that other provision which says that it is the duty of all local health officers to enforce all health laws and regulations.

Based on the opinion of the Attorney General's department, the State Board of Health interprets these various parts of the statutes to mean that the medical health officer of the town is to perform those medical functions which the town board or its chairman, not being physicians, are unqualified to perform, and then, upon the findings and advice of the medical health officer, the chairman of the board must see to it that the laws and regulations relating to the matter are carried out. This opinion has been uniformly accepted. It is probable that the establishment or release of quarantine by the medical health officer of a town would be legal, but the actual responsibility for it rests with the chairman, and possibly only the chairman or the town board as a whole could be successfully prosecuted for failure to establish and enforce the quarantine and other control measures which the health regulations require.

While the appointing of such a medical health officer for the town is mandatory, many boards for one reason or another have not done it. No attempt has been made to compel them to do it if in each instance, when such medical services are necessary, the board or chairman employs a phy-

sician. That is accepted as complying with the spirit of this law.

The law says that a city *must* and a village *may* provide for a board of health with one member a physician and such physician the health officer, but that if a village has not provided for a legal board of health, then the town board of health of the town in which that village lies must look after the health affairs of that village. Under such conditions the village is responsible to the town for any expense the town incurs in looking after such village's health affairs.

The law says that the compensation of all local health officers shall be prescribed by the body appointing them and, together with their necessary expenses, paid by the municipality or county they serve. This seems to cover compensation for medical health officers of townships as well as villages and cities, but does not seem to definitely provide for compensation to the chairmen of town boards of health. However, town boards may legally pay their chairman for his services as chairman of the Town Board of Health.

The law also provides for a county board of health and a county health officer and says that such health officer must look after the health affairs of all unorganized towns within the county. He has no direct authority in organized towns or villages or cities except to advise with the health officials of those places.

Three matters on which there is much lack of understanding on the part of local and county boards, physicians, attorneys, and sometimes even county attorneys, are:

1. Expenses in the control of communicable diseases;
2. Dealing with dangerous cases of tuberculosis;
3. Abatement of nuisances.

To consider these three in order:

Expenses in Control of Communicable Diseases

The law says that the chairman of a township shall employ at the cost of the town all medical and other help necessary in the control of communicable disease, and, upon receiving a properly itemized statement of such expenses, the county shall reimburse the town by one-half

of the amount. If the County Board refuses to so reimburse the town, the town board may appeal to the District Court. If the Court then finds that the expenditure was necessary and as authorized by the law, it will order the county to pay the town one-half of such amount.

It should be noted that this law refers specifically to "*expense necessary to control*" communicable disease. If the town board or its chairman incurs expense which is not "*necessary to control*," then such expense is not authorized by this particular law and the county is not responsible under this law for the reimbursement of any part of it. Medical treatment, nursing, medicines, food, fuel, etc., are not as a rule necessary for the control of the disease but usually are for the comfort and relief of the patient. If the patient, or his parents or guardians, are not financially able to provide such things, then the providing is a matter of poor relief. The fact that the need for such things arises largely because the patient is afflicted with a communicable disease, and if well he would be able to provide for himself, does not alter the matter. Such things are "*poor relief*" regardless of the nature of the sickness. It may possibly be the duty of the town board to provide such relief, but, if so, they do it as the board of supervisors and not as the board of health and not under any authority conveyed in these sections of the law relating to expenses in the control of communicable diseases.

But considerable latitude should be given when determining the purpose of such relief and what expenditure is necessary and legal for the control of communicable disease. That such expenditure may help cure or relieve the patient may be immaterial if it also tends to protect the public from infection. And so expenditures for vaccination against smallpox, immunization against diphtheria, curative doses of antitoxin, surgical removal of tonsils from persons in whom virulent diphtheria bacilli persist for a long time, and surgical removal of certain internal organs from permanent typhoid fever carriers, may be legitimate because they result in preventing sickness and making those treated no longer a menace to the public. Likewise expenditures for hospitalization in some diseases and under certain conditions may for the same reason be legitimate. This last is true for tuberculosis where home and living conditions are such as

to make hospitalization (preferably in a tuberculosis sanatorium) quite necessary to remove that source of danger to the public.

Examination of suspected cases of the communicable diseases, taking of cultures and other specimens for laboratory examination, and examination to determine if quarantine may be discontinued, are obviously necessary and proper steps for the control of the disease.

But the town board cannot be compelled to pay for any services or expenses, however necessary they may have been to control communicable disease, unless they were ordered by the board or chairman. Frequently a physician is called by the family and treats members sick with communicable disease. Some of his service is necessary in control, and if he had not done it, it would have been necessary for the town's medical health officer, or some other physician employed by the town board of health, to do it. The family being poor, the physician sends his bill to the town board. If the town board has not provided a regular medical health officer to give such service, it would seem that it should authorize such service of that attending physician as by its authority, and pay that part which was necessary to control the disease, instead of escaping a necessary expense on the technicality that the service was not ordered by the board. Had such service been delayed until the chairman had employed a physician to visit the case, the danger of spread of the infection to other residents of the town would very likely have been increased. But physicians should always make it a point to first secure the chairman's order if they expect the town to pay for any of their services.

Dealing with Dangerous Cases of Tuberculosis

It should be borne in mind that tuberculosis is a communicable disease, and that the law which says the chairman shall employ all help necessary to control communicable diseases applies to tuberculosis. Other laws which relate especially to tuberculosis say that if a health officer finds a case of tuberculosis which is endangering the public he may report the facts to the Board of County Commissioners, and that board may then commit the case to a tuberculosis sanatorium. If that county has its own county

sanatorium, the County Board naturally will send the case there; otherwise it may send it to a sanatorium maintained by some other county. If the County Board so commits the case, the county will pay the necessary maintenance costs. But this law does not say the County Board "must," it says, "may," and for some such cases County Boards have refused to so commit and pay maintenance costs. If the County Board refuses to so commit, the local health officials must proceed under those laws which relate to expenses in control of communicable disease, and usually the most effective and cheapest way of doing it is to send the case to a sanatorium and pay the necessary cost of maintenance. This cost is a necessary expense in the control of communicable disease, and the town has a just claim against the county for one-half of the amount. So if the County Board commits the case the county pays all the costs. If the County Board fails to commit, it must nevertheless reimburse the town for one-half of the costs if the town health officials do their duty in controlling the spread of the disease through isolation or quarantine of an infectious person in a sanatorium or other proper place.

The Abatement of Nuisances

The law says that when any nuisance, source of filth, or cause of sickness is found on any property, the health officer of the city, village or township in which it is, shall serve an order on the owner or occupant of that property, to remove the nuisance. If such order is not obeyed, then the health official shall have the nuisance removed or abated and report the cost of doing it, which must not exceed \$25.00, to the town, village or city clerk, who shall certify the amount to the County Auditor. The County Auditor shall assess the cost on the tax roll against that property, and, on receipt of the tax money, reimburse the town. It seems clear from the language in this law and the cost limitation, that local boards of health, health officers, or chairmen are not empowered to condemn buildings or businesses or say where this or that may be located or carried on, but only are empowered to compel cleaning up, removal of offensive matter, the cleaning out, repairing and fly-proofing of privies, cesspools, etc., which, if their order on the owner or occupant of the premises is not obeyed, they can carry out at a cost not to

exceed \$25.00. The only penalty in this law for failure to obey such order is the taxing of the property in an amount necessary to carry out such order, but not in excess of \$25.00. It would be unfortunate if there were no other provisions in the laws for the abatement of nuisances, but other sections of the laws authorize city and village councils to adopt and enforce nuisance ordinances. By such ordinances they may prohibit the location of, or doing, certain things in the municipality or in certain parts of the municipality, and may regulate their construction and maintenance. An ordinance may make it the duty of the health officer or of the village marshal (preferably the latter) to enforce the ordinance. Under such ordinances the citizens will know what they may and may not do, violations will be misdemeanors and arrests may be made and fines imposed. The adoption of such ordinances is the most effective way of dealing with the nuisance problem, and if their enforcement is made the duty of the local police officials it will largely relieve the health officer of duties which are often onerous and do not require medical qualifications. The duty of the local health officer to act under the state law will still remain if the ordinance provisions are not enforced and nuisances exist.

Unfortunately, this power to adopt ordinances does not extend to *towns* since town boards do not have power to adopt ordinances. Very frequently there are nuisances in towns which cannot be effectively abated by serving and enforcing orders to clean up as provided for in the state law. In such cases the final remedy seems to lie in an appeal in the courts by those affected by such nuisances. Such appeal is provided for under another section of the statutes which says that any one affected by a nuisance may bring an action in the courts and the courts may issue injunctions and award damages.

For the purpose of this discussion we may divide nuisances into two classes:

1. Private nuisances
2. Public nuisances

In considering the first of these, *private nuisances*, health officials should understand that it is not their duty to deal with nuisances that may properly be construed as strictly "private nuisances." Private nuisances are such as affect only one individual or family, and in no way

involve the health, comfort or general welfare of the rest of the town or that section of the town. But the distinction between a "private" and a "public" nuisance may not always be easy to draw. An insanitary privy, cesspool, manure pile, garbage accumulation, or other similar small nuisance condition, may primarily and particularly affect only one or two individuals or families, but also may affect the general decency, welfare or health of the whole town, or a considerable section of the town. It then should properly be considered a public health nuisance and be dealt with under the provisions of the public health nuisance laws and ordinances. Strictly private nuisances, such as spite fences, etc., which have no general public health significance, may only be dealt with by the courts through private action in the courts.

Public nuisances, for the purpose of this discussion may be subdivided into three classes:

1. The ordinary nuisance of the public health type;
2. The offensive trade nuisance;
3. The state-wide or sectional nuisance.

The ordinary public health nuisance includes such things as privies, cesspools, dumps, garbage, pigpens, dead animals, etc. Although these may primarily only affect one or a few people, they also affect the community as a whole. Insofar as the laws give authority for it, health officials should deal with them, and village and city councils should adopt ordinances to control them.

The offensive trade nuisance is also subject to control by the health officials under the general nuisance laws and regulations, but in addition there are special laws relating to offensive trades. These special laws say that no one may operate an offensive trade except under written permission by the board of health of the town, village or city in which located. A severe penalty is provided for operating without such permit. Whether a business or occupation is or is not an "offensive trade" is not always easy to say. The laws relating to them do not definitely define what an offensive trade is, nor have the courts done so. Each case must be determined on its own individual merits, and this may be a matter which requires legal advice or possibly decision of the courts. It is generally accepted that just because in certain occupations there are odors which are more or less disagree-

able to some persons living or working in the vicinity, such occupations are not necessarily to be classed as "offensive trades." Otherwise it might be necessary to require offensive trades permits for such things as tire repair shops, bakeries, meat markets, groceries, canneries, and many other things. The State Board interprets the intent of this law to be, that an "offensive trade" is an occupation in which very offensive and widespread odors are impossible or exceedingly difficult to prevent. In this class may very properly be included such things as rendering

establishments, hog feeding and fattening ranches, and, in many cases, slaughter houses.

Statewide or sectional nuisances include nuisance conditions which affect or cover a considerable area of the state and a considerable part of the population. Those who suffer special injury from a statewide nuisance may seek relief in the courts. If a county is particularly affected, through its county attorney it may bring the matter into the courts, and on behalf of the State, the State's Attorney General may do so.

ULTRAVIOLET THERAPY*

MILAND E. KNAPP, M.D.
Minneapolis, Minnesota

Physics and Physiology

THE wave-length of visible light ranges from approximately 770 millimicrons at the red edge of the spectrum to 390 millimicrons at the violet. One millimicron or μ is one-millionth of an inch. The ultraviolet or invisible radiations of shorter wave-length than the violet then continue to about 10 μ where it overlaps the roentgen radiations. They are usually divided into three groups, the near ultraviolet from 365 to 290 μ , the far ultraviolet from 290 to 180 μ , and the extreme ultraviolet from 180 μ to the range of the x-ray group.

It is important that we understand the variations in wave-length because much of the confusion in the literature concerning ultraviolet radiation has been a direct result of lack of definite information about the exact type of radiation used.

The penetration of ultraviolet rays through the tissues varies with the wave-length although they all are absorbed in the superficial layers. The far ultraviolet (180 to 290 μ) penetrate the dermis only 0.1 to 0.5 mm. This is really only through the stratum corneum of the skin while the near ultraviolet (290 to 365 μ) penetrate 0.5 to 1 mm. according to Coblenz.² This is into the stratum mucosum or basal cell layer of the epidermis.

The penetration of ultraviolet radiations through inorganic substances also varies with the wave-length. The short wave limits of transparency of various substances is shown in the following table (after Luckiesh).³

	millimicrons
Fluorite	125
Quartz (crystalline)	145
Quartz (fused)	185
Blue rock salt Beyond	225
Light crown glass	295
Blue Topaz	296
Ruby	300
Medium crown glass	300
Light flint glass	305
Blue diamond	315
Emerald	320
Heavy flint glass	340

Thus window glass and especially heavy glass is opaque to most of the active radiations. Quartz is the most practical medium of those transparent to most of the ultraviolet radiations. There are some special types of glass which are transparent to the wave-length of ultraviolet in the region of 320 to 290 μ .

Physiology

The action of ultraviolet radiation is photochemical in nature. There is a definite latent period of several hours before the maximum effect is reached. This is followed by a gradual return to normal. The exact nature of the underlying physiological process is not known but the physiological effects may be listed as follows according to Bachem:¹

*Condensed from a lecture given at the Seminar of the American Congress of Physical Therapy at Chicago, Illinois, September 7-10, 1938.

ULTRAVIOLET THERAPY—KNAPP

PHYSIOLOGICAL EFFECTS OF ULTRAVIOLET LIGHT

Local

1. Erythema (with short latency)
2. Ultraviolet conjunctivitis (snow blindness)
3. Vasodilation
4. Pigmentation
5. Blistering (sunburn)
6. Tissue stimulation
7. Germicidal and cytotoxic effects
8. Sterol activation

Systemic

1. Sympathetic nervous system stimulated (or depressed)
2. Assimilation and elimination increased
3. Internal secretion increased
4. Calcium and inorganic phosphorus fixed
5. Gastric secretion increased
6. Hemoglobin, erythrocytes and platelets increased
7. Clotting time shortened
8. Blood pressure lowered
9. Resistance toward infection mobilized
10. Toxic effects.

Many and perhaps all of these effects vary according to the wave-length. For example, in general the shorter wave-lengths are more bactericidal. Indeed there seems often to be optimum wave-lengths for the destruction of individual types of organisms. The longer wave-lengths are more pigment forming and those near to visible light produce the best tan. The erythemogenic effect has one peak at about 250 μ and another at about 300 μ . The anti-rachitic effect also follows a definite wave-length distribution as shown by Coblenz.³

It is probable that many of the other effects will follow definite wave-length curves also. These may be determined in the future by spectrographic methods with suitable filters.

Technic

Exact technic is essential to progress in any field and the field of ultraviolet irradiation is no exception to this rule. One of the most powerful impediments to progress in this field has been the lack of specific technical details when results have been reported.

In specifying a technic we must first know the spectral composition of the source of radiation used. This varies, of course, with the type of lamp and the filters used. This information can be secured from the Council on Physical Therapy of the American Medical Association if desired. Secondly, we must give an accurate dosage of radiation. And, third, we must consider the skin susceptibility of the individual patient. In general brunettes are more resistant to ultraviolet, blonds are more sensitive and red heads are the most sensitive.

The dosage is determined by the spectral distribution and intensity of the source, the distance of the source from the part to be treated, and the angle at which the rays strike the part.

Coblenz⁴ has suggested that the dosage should be measured in Finsen units. He defines this unit as a "radiant flux of 10 microwatts (100 ergs) per square centimeter per second of homogeneous radiation of the wave-length 2,967A°."

Other units of erythemogenic action have been suggested by other authors.

The most practical unit for the ordinary clinician is the minimal erythema dose. This may be defined as the shortest exposure at a certain distance that will produce a perceptible reddening of the skin which disappears within twenty-four hours. This will vary, of course, with different skin types. However, it is easily determined for any given lamp by exposing small areas on the anterior surface of the forearm to a series of regularly increased quantities of radiation and thus determining the one which causes a minimum perceptible erythema. The dosage varies according to the duration of exposure, the distance from the patient, and the angle at which the rays strike the part to be treated.

The dosage varies directly with the duration of exposure.

The inverse square law states that the intensity of radiation from any point source varies inversely as the square of the distance from the source when the absorption by air is negligible. This means that reducing the distance by one-half provides not twice but four times the dose. And reducing the distance to one-third does not produce three times the dose but nine times the previous dose.

The "cosine law" states that the energy per square centimeter is proportional to a constant times the cosine of the angle made by a line connecting the source and the patient, and the line perpendicular to the patient's body. That constant is the light per square centimeter when the patient is perpendicular to the line joining the light and the patient. This means that the lamp should be as nearly at right angles to the part to be treated as possible.

One must be sure that the rays are not absorbed by ointments, crusts, dressings etc., that cover the part to be treated. The part should be thoroughly cleansed with soap and water if oint-

ments have previously been used. The lamp should be kept clean and checked frequently for efficiency.

Indications

Ultraviolet irradiation has been recommended for such a ridiculously large variety of diseases that it is absurd to name them all or even to imagine that this agent is really of value in them all. However, there are a few diseases where the use of ultraviolet radiation is scientifically correct and a number more where its use is supported by enough clinical evidence to be impressive.

1. *Rickets, Infantile Tetany or Spasmophilia, and Osteomalacia.*—The well-proved ultraviolet effect upon calcium metabolism by the formation of Vitamin D makes its use rational in these conditions.

2. *Tuberculosis.*—Most authorities agree that ultraviolet radiation is useful as an adjunct to the usual treatment (bed rest, food, et cetera in extrapulmonary tuberculosis. This includes tuberculosis of the bones or joints, of lymph glands, of the peritoneum and intestines, and of the genito-urinary system.

In some selected forms of chronic pulmonary tuberculosis many workers think that ultraviolet therapy is indicated while others believe that it is contra-indicated in all forms of pulmonary tuberculosis.

3. *Erysipelas.*—In my opinion ultraviolet irradiation is the method of choice in the treatment of erysipelas. The mode of action is not yet understood but the clinical results can no longer be doubted. We have treated more than 500 cases by this method with very satisfactory results.

However, it is extremely important that heavy doses of ultraviolet be given in the treatment of erysipelas—six to twenty erythema doses being used according to the type and efficiency of the lamp employed.

4. *Certain Skin Diseases.*—Many dermatologists employ ultraviolet as an aid in the treatment of certain skin affections. Among these may be listed lupus vulgaris, scrofuloderma, pityriasis rosea, psoriasis, acne vulgaris, adenoma sebaceum, erythema induratum, and alopecia areata.

5. *Indolent Ulcers.*—Some well-controlled work has indicated that ultraviolet is of value in the treatment of indolent ulcers and to pro-

mote the healing of wounds in general. This includes the use of ultraviolet in the treatment of chronic draining sinuses, decubitus ulcers and such conditions when it is possible to reach the affected areas with ultraviolet radiation. It is important to use small doses.

6. *Burns.*—Following extensive burns the healing period may be greatly shortened by the use of ultraviolet radiation according to Peck.⁷

7. *Tonic Ultraviolet.*—In many chronic diseases where malnutrition or deprivation of sunlight due to hospitalization is a factor, the use of ultraviolet radiation is indicated for its tonic and psychological effects, as well as its anti-anemic effects. It may also aid in the prevention of bed-sores. In this group may be included sufferers from arthritis of any type, paralysis, multiple sclerosis, neurasthenia, hemiplegia, and many other chronic conditions. However, "as far as normal persons are concerned, the claim that exposure to ultraviolet rays increases or improves the tone of the tissues or of the body as a whole, stimulates metabolism or tends to prevent colds has not been conclusively substantiated" according to the Council on Physical Therapy of the American Medical Association.⁵

Contraindications

The use of ultraviolet radiation is generally agreed to be contraindicated in active and progressive forms of pulmonary tuberculosis, hyperthyroidism, diabetes, highly nervous people, patients with advanced cachexia or inanition and aged people with acute or chronic nephritis or myocarditis.

It is also contraindicated in certain skin diseases. These include: all forms of generalized dermatitis, lupus erythematosus, herpes simplex, erythema solare perstans, xeroderma pigmentosum, hydroa estivale, freckles, atrophy, keratoses, and prematurely senile skin.

References

1. Bachem, A.: Physiology and therapeutics of various currents and radiations. *Arch. Phys. Therapy*, 12:366, (June) 1931.
2. Coblenz, W. W.: Sources of artificial radiation and their physical properties. In: Mack, H. E., Pemberton, R., and Coulter, J. S.: Principles and practice of physical therapy. Hagerstown; Prior, 1934, 1:9-2.
3. Coblenz, W. W.: The physical aspects of ultraviolet therapy. *Jour. A.M.A.*, 111:419, (July 30) 1938.
4. Council on Physical Therapy: *Jour. A.M.A.*, 99:31, (July 2) 1932.
5. Quoted from Krusen, Frank H.: Light therapy. First Edition, P. B. Hoeber.
6. Luckiesh, M.: Ultraviolet Radiation. New York; D. Van Nostrand Company, 1922.
7. Peck, W. S.: Application of physical therapy measures in the treatment of burns. *Arch. Phys. Therapy*, 12:327, (June) 1931.

PERFORATING WOUNDS

JOHN M. CULLIGAN, M.D.

Saint Paul, Minnesota

ACCIDENTS which produce perforation of the large cavities of the body are serious and tax to the utmost the judgment and technical ingenuity of the surgeon. The mortality is necessarily high due to the fact that vital organs are frequently involved in the perforation and there is always the danger of infection.

"When in doubt, do not operate immediately" is a fairly good maxim to follow when dealing with obscure diseases. However, the converse is very definitely true when dealing with any perforating wound. The dictum "When in doubt, operate" is the much safer procedure. If the perforation has only resulted in a wound of the abdominal or chest wall and if no vital structures are injured, no harm is done by a simple incision to ascertain the extent of injury (Cases 1, 2 and 3). On the other hand many patients who have perforating wounds of vital organs may not appear ill when first seen. Delay until the patient appears ill results in a great increase in both mortality and morbidity. The dangers of increasing shock, hemorrhage and infection are multiplied with every hour of delay. Therefore, immediate exploration should be the rule in dealing with wounds of this nature.

Food Ingestion

Injury sustained to the gastro-intestinal tract shortly after a large meal carries more risk from perforation and spread of infection than when the stomach and small bowel are relatively empty. Soiling and infection of the peritoneum combined with the peristalsis attendant upon digestion all play a part in making the prognosis more grave.

Anesthesia

For first-aid treatment it may be well to employ no anesthesia at all. In cases of hemorrhage, a spurting artery should be clamped. A gaping wound with oozing may be packed. A chest wound may be closed hurriedly to relieve asphyxia and the attendant suffocation. Measures of this nature may be undertaken with no

anesthetic or a little novocaine while waiting for the operating room to be prepared. The choice of the anesthetic to be employed for the major exploration is ether, or nitrous oxide and ether. Ethylene has a slight tendency to increase hemorrhage and is, therefore, an anesthetic of second choice in any case where bleeding may be a factor. The attendant shock with its great fall in blood pressure makes spinal anesthesia a poor selection though this may be more theoretical than actual. Spinal anesthesia may only cause a farther drop in blood pressure and increase the manifestations of shock. For this reason I think it should be avoided though at times it may be indicated. I have had no personal experience with intravenous anesthetics in cases of this kind. Local infiltration may be employed if desired but it has the disadvantage of making a thorough exploration difficult or impossible and thorough exploration is always essential so that no perforation or injury to internal organs will be overlooked.

Hemorrhage

It is surprising how often a penetrating wound of the abdomen is accompanied by little or no hemorrhage (Cases 10 and 11) when one considers the number of large vessels which might be encountered. On the other hand perforation of any of the great abdominal vessels usually results in death before any surgical intervention can be employed. Hemorrhage in the mesenteric vessels is usually self-limited because a hematoma forms which of itself favors clotting and cessation. However, any actively bleeding vessel should be ligated and the bowel supplied should be watched for ten or fifteen minutes for viability. If it becomes apparent that the blood supply is impaired, resection must be performed. Hemorrhage from perforation of the spleen (Cases 9 and 13) or kidney (Cases 13 and 14) require splenectomy or nephrectomy. Perforations of the liver are practically impossible to suture and, as the organ cannot be removed, packing tightly with gauze is the procedure of choice.

Location of Wounds and Organs Involved

Chest.—A clear understanding of the physiology of respiration must be in mind in cases involving puncture wounds of the chest wall. Any wound of this character immediately destroys the negative pressure of the pleural cavity and causes a collapse of the lung. In cases of bilateral puncture the resulting pneumothoraces are dangerous in the extreme. Asphyxia and suffocation result from inability of the lung or lungs to expand and aerate the pulmonary circulation. In order to obviate this the chest cavity should be closed immediately by through-and-through sutures so that the pleural cavity is made air-tight. If there are still signs of asphyxia and suffocation, a needle should be inserted between the ribs (Case 5) and air aspirated in order to restore negative pressure and aid the lung in expanding. When, in a perforation of the chest wall, a pneumothorax is complicated by hemothorax (Cases 4 and 7), closure of the chest cavity is equally important in that the pressure of the blood in the closed cavity acts as a hemostatic and stops the bleeding. No attempt should be made to aspirate any fluid until convalescence is well under way (Cases 4 and 7). When the lung itself is lacerated, the case of course assumes much more serious proportions. This is usually evidenced by the appearance of pink frothy blood coming from the mouth. Tight closure of the chest wound and supportive measures in the form of intravenous medication and transfusions are in order. In cases involving the chest wall and diaphragm, the opening in the diaphragm must be closed (Case 9) and if it is detached from the chest wall it must be replaced if possible. I have had no personal experience with injuries to the heart and pericardium. However, cases are reported in the literature where suture of the cardiac musculature and pericardium have been successfully carried out.

The Gastro-Intestinal Tract. — Perforating wounds of the abdomen puncture the gastrointestinal tract more frequently than any other one organ (Cases 9, 10, 13, 14, 15, 16, 17, 18 and 19). The number of perforations may vary from one or two to twenty or forty or more. A single bullet may cause a dozen or more while a shotgun charge may cause a very large number (Case 9). Immediate exploration is indi-

cated through an incision fairly close to the midline. This is necessary because the perforations in the bowel may lie at a considerable distance from the site of entrance or exit of the bullet and it is advisable to make an incision through which the entire bowel may be examined. Usually the number of openings in the bowel are even in number (Cases 10, 16, 17 and 19), there being usually one exit wound for each entrance wound. If the number of perforations is uneven, careful search should be made for another (Case 16). Perforation may at times be hidden at the margin of the mesenteric attachment and only careful search will reveal it. If the number is still uneven, one should satisfy himself that one of the perforations is tangential (Case 15). If a single perforation is found in the ascending or descending colon, the parietal peritoneum should be incised and the posterior extra-peritoneal portion of the bowel should be examined. The openings should be closed with two layers of Dulox catgut, suturing transversely. The first layer through the mucosa should be an over-and-over running stitch which everts the mucosa. The second layer should be through the muscularis and serosa, using a Lembert suture. The higher in the tract that the perforations occur, the better the prognosis, as the danger of infection increases the farther the wound is from the stomach. Nasal suction should be employed routinely in all cases of perforation of the bowel or where infection is anticipated.

The Spleen.—When the spleen is perforated, splenectomy must be performed along with whatever other surgery is necessary (Cases 9 and 13). Due to the great vascularity of the spleen, much loss of blood and shock usually accompany the wound. Splenectomy usually is not very difficult. When unassociated with perforations of other organs, the prognosis is usually good, provided the patient is explored early.

The Kidneys.—Puncture wounds of one kidney are in about the same category as the spleen as far as procedure is concerned: That is, nephrectomy is indicated (Cases 13 and 14). This, however, requires that the nephrectomy be performed through an abdominal incision inasmuch as the abdominal cavity must be explored at the same time. However, after incision of the parietal peritoneum of the ascend-

ing or descending colon and displacing the large bowel medially, nephrectomy can usually be performed without a great deal of difficulty. Prognosis again depends on the amount of damage to other organs and the amount of blood lost.

The Liver.—Perforating wounds of the liver are always serious and the prognosis is always grave (Cases 4, 12, 17 and 19). In my series very few patients who have sustained this type of injury survived. The hemorrhage is usually great and the attendant technical difficulty of controlling it adds to the seriousness of the problem. Suturing is usually impossible and packing is the method of choice and this is usually inadequate. No doubt the factor of "liver shock" also plays a part in increasing the seriousness of the prognosis. Just what "liver shock" is, is not definitely understood, but it must be recognized as a clinical entity.

The Pancreas.—Injuries to the pancreas are also very dangerous. The inaccessibility of the organ for surgery and the necrosis which follows from the liberated pancreatic juice are the main reasons for mortality and a grave prognosis.

The Bladder.—Perforations of the bladder may at times tax one's surgical judgment. Signs of extravasation are usually present and the lack of return of urine on catheterization should lead one to be prepared. No hard and fast rule can be laid down as to procedure but perhaps the method of choice is tight closure of the bladder and postoperative insertion of an indwelling catheter. The prognosis depends on the amount of soiling, the time element and injuries to other organs.

Shock

The picture presented by these patients is usually one of extreme gravity (Cases 4 to 19). Although an occasional individual even when seriously injured may give the appearance of well-being, this is not the rule. There is usually extreme shock, characterized by pallor, cold perspiration, cyanosis, air hunger, a weak, thready, rapid pulse, and a low blood pressure. Therefore the patient must be treated for shock as well as for his injury. It is well to institute intravenous medication of saline with adrenalin

during and even before the operation. Preparations for transfusion should be started immediately for administration during or after the operation. It is usually well to keep the patient in the operating room following the operation until the shock is overcome by supportive measures. Ephedrin and hot water bottles are indicated along with the intravenous treatment.

Infection

If the immediate dangers of shock are surmounted and the perforations repaired satisfactorily, the next concern is that of infection. (Cases 4, 9, 12, 15, 16, 17 and 20). Pneumonia, lung abscess, peritonitis, subdiaphragmatic abscess, and pelvic abscess are the commonest infections which may follow. With the advent of infection these are the locations where one should first look in an attempt to localize and treat the sepsis.

Case Reports

The following series of case reports on twenty-one patient illustrate many of the points made above. The case histories are abstracted very concisely and only the most salient points brought out.

A résumé of the mortality in this group of twenty-one cases reveals there were five deaths or approximately 24 per cent.

In Case 9 death resulted from multiple abscess in both the chest and the abdomen following forty perforations in the bowel due to a shotgun charge.

In Case 12, following a stab wound injury to the liver, subdiaphragmatic abscess, general peritonitis and pleural effusion were the cause of death.

In Case 14 death resulted in less than twenty-four hours probably from the shock from loss of blood as he had both hemoperitoneum and hemothorax.

In Case 17 the patient had a perforation of the liver, small bowel and large bowel. Death resulted from general peritonitis, pneumonia and one opening in the bowel in the retroperitoneal portion of the duodenum.

In Case 18 the patient died from the shock following the passage of an iron bar and cloth-

ing through his abdomen. In other words, this patient was killed by the accident rather than by complications.

Sliver of Wood in the Abdominal Wall

Case 1.—An eleven-year-old girl, while running, fell on a sliver of wood. It entered the abdominal wall just to the right of the umbilicus and proceeded in a downward direction. A wooden sliver, six inches long, entering the abdominal wall and extending into the right labia majora was removed. The abdominal cavity was not punctured. Uneventful convalescence.

Perforation in Gluteal Region

Case 2.—A 38-year-old man fell over a box and landed on a sharp branch of a tree. It penetrated the gluteus maximus. The patient's general condition was good and when the branch had been pulled out he was brought to the hospital. It was thought advisable to explore the tract because of the possibility of perforation into the pelvic or abdominal organs. On opening the tract it was found to extend only into the deep gluteal muscles. Uneventful convalescence.

Pitchfork Prong Through Wing of Ilium and Abdominal Wall

Case 3.—This thirty-five-year-old farmer slid from a stack of hay. A pitchfork had been placed prongs upward against the stack, and he was impaled on this. A prong entered the region of the right hip and perforated the wing of the ilium. The patient felt it go through the bone. The fork had been pulled out. Exploration revealed that the prong had perforated the wing of the ilium in an upward direction. It had penetrated the abdominal wall and grazed but did not perforate the cecum. Exploration revealed no puncture wound of any intra-abdominal organ. Uneventful convalescence.

Bullet Wound of Right Chest, Lung and Liver

Case 4.—A twenty-seven-year-old negro was shot by a "friend" through the right chest just below the nipple. The bullet had lodged in the right axillary region below the level of the nipple. There was some question whether the diaphragm and dome of the liver had not been seared by the bullet. The chest wound was closed. Hemothorax developed. The patient made a very slow convalescence, but after four months the chest began to clear. In eight months marked improvement was present and the patient was discharged. Twelve months after the accident the chest was normal on examination.

Eleven Stab Wounds

Case 5.—A thirty-year-old man was attacked while sleeping by an enraged manic-depressive relative. Eleven stab wounds were inflicted: three through the left chest wall, one through the right chest wall, two in the throat, one in the left eyelid, one in the ear, two in the wrist, one in the left lumbar region. The patient, when seen, was in extreme shock, gasping for

air because of bilateral pneumothoraces. In the dressing room of the hospital the chest wounds were immediately sutured with through-and-through silk-worm sutures. A needle on a large syringe was inserted between the ribs on both sides of the chest and air aspirated. Respirations improved, the gasping ceased and the patient was taken to the operating room where his other lacerations were repaired. Supportive intravenous medication was given. Uneventful convalescence.

Thirteen Stab Wounds

Case 6.—This patient was the wife of the patient in Case 5. When she discovered her husband being attacked by a man with a knife, she went to his aid. The maniac turned on her and inflicted thirteen stab wounds. They were located in the face, neck, nose, left lower leg, right medial thigh and arms. The patient was in extreme shock. Supportive measures were started and the stab wounds repaired. Uneventful convalescence.

Bullet Wound of Chest

Case 7.—A sixteen-year-old boy, suffering from asthma, shot himself with a .22 calibre gun. The bullet entered the left chest above the nipple and came out in the axillary line. He was brought to the hospital and did not look ill. His only complaint was slight pain in the chest. His wounds were merely dressed. The chest filled with fluid but nothing was done about it. In three months, x-rays revealed the complete absorption of the fluid and the chest apparently normal.

Bullet Wound of Chest and Lung

Case 8.—A sixteen-year-old boy was shot by a .38 calibre pistol bullet in the hands of an older brother. The bullet entered the left chest in the third interspace anteriorly and lodged beneath the skin in the sixth interspace posteriorly. He was in extreme shock, unconscious, and his pulse thready and skin cold and moist. There was subcutaneous emphysema of the chest wall. The wound of entrance of the bullet was closed. Supportive measures were instituted. The patient ran a stormy course but was much better in five days. The bullet was removed from the back one week after the accident. The patient was discharged three weeks later in good condition.

Shotgun Wound of Abdomen and Chest

Case 9.—This twenty-two-year-old man, with suicidal intent, placed the butt of a shotgun on the floor, leaned over the muzzle and reached down and pulled the trigger. The shot tore away the left upper quadrant of his abdomen and lower ribs and diaphragm. He was brought to the hospital gasping for breath because of a pneumothorax. The bowel was eviscerated. The patient was in shock. Supportive measures were instituted. Through the gaping wound the diaphragm was sutured to the lateral chest wall in a position higher than its normal attachment with through-and-through catgut sutures. Breathing immediately im-

PERFORATING WOUNDS—CULLIGAN

proved. The shredded ends of the tenth and eleventh ribs were removed. A splenectomy was performed. More than forty perforations of the large and small bowel were closed. The left kidney was not removed though shot could be felt in the capsule. A large retroperitoneal hemorrhage had occurred. The wound was closed as well as possible. For a time it seemed as though the patient might recover, but death occurred on the sixteenth postoperative day. The cause of death as reported at postmortem was: (1) local peritonitis; (2) sub-diaphragmatic abscess; (3) left empyema; (4) abscess of left lung; (5) multiple abscesses of left kidney.

It is interesting to speculate on how the defect in the abdominal wall could have been repaired had the patient recovered.

Bullet Wound Through Abdomen

Case 10.—This seventeen-year-old boy, while hunting, was struck by a .22 calibre bullet from a gun in the hands of a friend. The bullet perforated the sacrum and went through the abdomen, lodging in the skin of the anterior abdomen just lateral to the umbilicus. The patient was in shock. On exploration, ten perforations of the small bowel and four through the mesentery were found. The openings in the bowel were closed transversely with two layers of Dulox catgut. Supportive measures were instituted for shock. Uneventful convalescence.

Lacerations of Throat and Abdomen

Case 11.—A young man of twenty-eight years, grieving over the recent death of his wife, slashed his throat and abdomen six times with a razor. He was in extreme shock from loss of blood. Supportive measures were given. The lacerations in the throat, tongue and pharynx were repaired. Evisceration of the bowel had taken place through the abdominal lacerations, but it was not perforated. The bowel was replaced and the abdomen sutured. Uninterrupted convalescence.

Multiple Stab Wounds of Abdomen, Liver and Diaphragm

Case 12.—A twenty-nine-year-old man, while engaged in a drinking brawl, was stabbed by his brother. Three wounds of the abdomen were found, one each in the upper quadrants and one in the right lower. The one in the right upper quadrant had penetrated the liver and diaphragm and penetrated the chest. The wound in the liver was packed and the eviscerated bowel replaced. The patient died on the twelfth postoperative day. The postmortem causes of death were: (1) stab wounds of abdomen, liver and diaphragm followed by general peritonitis and sub-diaphragmatic abscess; (2) pleurisy with effusion; (3) cloudy swelling of heart, liver and kidneys.

Bullet Wound of Abdomen Penetrating Spleen, Mesentery and Kidney

Case 13.—A nineteen-year-old clerk in a drug store was held up and shot in the abdomen by a bandit. The

patient was in extreme shock. Supportive measures were instituted. The bullet had entered the abdomen in the left upper quadrant and lodged in the lumbar muscles. On exploration through a left rectus incision, it was found that the bullet had perforated the spleen, left kidney and transverse mesocolon. The spleen and kidney were removed and the rent in the mesocolon repaired. After three weeks the bullet was removed from the lumbar muscles. Uneventful convalescence.

Bullet Wound of Abdomen, Kidney and Diaphragm

Case 14.—This thirty-five-year-old man stated that he was rummaging through a tool chest in which was a loaded pistol. It accidentally discharged, striking him in the abdomen. A bullet wound just lateral to the umbilicus on the left was found. The bullet lodged in the skin in the left lower chest posteriorly. Exploration revealed four perforations of the small bowel, which were repaired, one in the transverse mesocolon and one through the left kidney. The kidney was removed after laying the descending colon medially. The patient's extreme shock was treated by supportive measures but he died within twenty-four hours. The postmortem causes of the death were: (1) gunshot wound of abdomen; (2) lacerations of small intestine and kidney; (3) hemoperitoneum; (4) hemothorax; (5) bilateral congestion and edema of the lung.

Bullet Wound of Abdomen

Case 15.—This eleven-year-old boy was shot through the abdomen by a .22 rifle in the hands of a playmate. The bullet entered the right lower quadrant of the abdomen and lodged in the region of the left acetabulum. On opening the abdomen much free blood was found. There were eleven intestinal perforations in all: three in the cecum, one tangential; six in the ileum; and two in the sigmoid. They were all closed transversely. The patient made a good convalescence in spite of an infected wound and was discharged in six weeks.

Bullet Wound of Abdomen

Case 16.—This twenty-six-year-old patient, while attempting to escape the police, was shot just lateral to the left sacro-iliac synchondrosis. The bullet lodged in the skin just to the left of the umbilicus. Exploration revealed a large retroperitoneal hemorrhage, two perforations of the jejunum at the ligament of Treitz and two of the stomach. These were closed. Retroperitoneal exploration did not reveal the bleeding artery. The kidney was not injured. The patient was transfused but died the next day. Postmortem revealed: (1) general peritonitis; (2) left lobar pneumonia; (3) cloudy swelling of the heart, liver and kidneys; (4) acute splenitis.

In this case only one hole was found at first in the jejunum, but on opening into the lesser peritoneal cavity the second was found, showing the value of looking for two holes.

CYST OF THE SEPTUM PELLUCIDUM—BERKWITZ

Bullet Wound of Abdomen

Case 17.—This forty-year-old patient, while standing in a beer tavern, was shot by another man for "no reason at all." The bullet entered the right abdomen just below the ribs and lodged in the left hip. It perforated the liver, the ascending colon in two places, the ileum in six places and the sigmoid in two places. These were all closed by double-layered Dulox catgut. The liver was sutured with mattress sutures. Supportive measures failed and the patient died eight hours later. Postmortem causes of death were: (1) general peritonitis from gunshot wound; (2) bilateral bronchopneumonia; (3) congestion and edema of the lungs. One perforation of the retroperitoneal position of the duodenum just distal to the ampulla of Vater had been overlooked at operation.

Massive Perforation of Abdomen by an Iron Bar

Case 18.—This forty-three-year-old man was sleeping beneath a train. The train started and a broken truss rod, protruding from a box car, impinged upon his abdomen and pole-vaulted the car over his body. This iron bar, measuring 1x6x58 cms., was driven through his body in the left upper quadrant of the abdomen. It carried parts of his coat and shirt through with it. He was brought to the hospital with the bar protruding 8 or 10 cms. in front and back. Through a transverse incision from the midline of the abdomen to almost the spine in the back the bar and clothing were removed. The jejunum was completely severed in two places. These were repaired by end-to-end anastomoses. Several rents in the jejunum were also closed. A large rent in the mesocolon was repaired. The wound was closed and a transfusion was given immediately. He rallied well, but died within twenty-four hours.

The postmortem cause of death was: (1) puncture wound of abdominal wall, with multiple ruptures of the small intestine; (2) shock.

Multiple Bullet Wounds

Case 19.—In a gangland war, a man was shot through the abdomen four times in the right lower quadrant, four times through the right arm and once in the right hip. The patient was in shock. Supportive measures were instituted and the abdomen explored. Four perforations of the transverse colon were closed. The liver was slightly lacerated. This was packed. A retroperitoneal exploration revealed a large hematoma but no injury to the kidney. The patient made a slow but uninterrupted convalescence and fled the hospital on the fifty-eighth day after his injury.

Bullet Wound of Left Groin

Case 20.—This forty-three-year-old male, while attempting to flee after a burglary, was shot by a policeman. One bullet singed his hand and one struck him in the left groin. X-rays revealed the bullet lodged in the region of the left acetabulum. The patient began running a septic course, and eight days later exploration was made for the bullet, going between the sartorius muscle and the rectus femoris. The capsule of the hip joint was incised and about a tablespoonful of pus was evacuated. The bullet was removed from the posterior edge of the acetabulum. Convalescence was uncomplicated from then on.

Perforating Wound of Uterus

Case 21.—This thirty-five-year-old woman, in attempting an abortion upon herself, inserted a Couday catheter into the uterus. She perforated the dome and the catheter slipped away from her. She was brought to the hospital, three days later, with all the clinical signs of peritonitis. Exploration revealed a generalized peritonitis and the catheter was found wrapped in folds of the omentum. This was removed and the abdomen drained. The patient had a stormy convalescence but recovered and was discharged from the hospital on the twenty-third postoperative day.

NONCOMMUNICATING CYST OF THE SEPTUM PELLUCIDUM*

With Recovery Following Ventriculography

NATHANIEL J. BERKWITZ, M.D., Ph.D.

Minneapolis, Minnesota

IN THE seventeenth century Sylvius observed in several brains dilatation of the cavum septum pellucidum (fifth ventricle). Verga,⁷ in 1851, discovered a cavity posterior to the cavum septum pellucidum which he suggested naming "the sixth ventricle," now known as the cavum vergæ. At the time no clinical significance was attached to these findings.

*From the Division of Nervous and Mental Diseases, University of Minnesota. Read before the Central Neuropsychiatric Association meeting, Minneapolis, October 7, 1938.

These two cavities are not always present. In thirty consecutive brains examined at the University of Rochester, Van Wagenen and Aird⁶ report that dilatation of one sort or another of the septum pellucidum was demonstrated in eighteen, or 60 per cent. These writers believe that these two cavities are one embryologically, and only in chance variations are they found to develop separately. The cavities may become so distended by accumulation

CYST OF THE SEPTUM PELLUCIDUM—BERKWITZ

of fluid as to occlude the interventricular foramina and produce hydrocephalus and other neurological changes.

By means of ventriculography, Dandy,² in

version of a noncommunicating to a communicating dilatation by means of a fistulous opening relieves the patient and brings about a clinical recovery.



Fig. 1. Skull x-ray, November 14, 1931, showing decalcification of the dorsum sellae, erosion of the floor, and enlargement of the fossa.

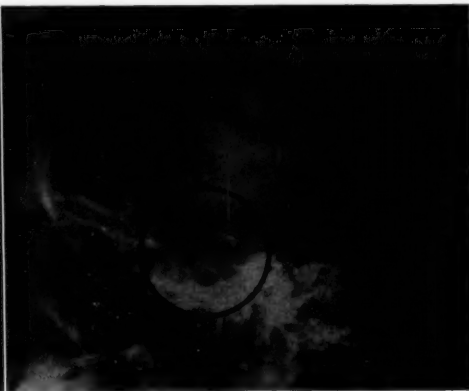


Fig. 2. Skull x-ray, October 31, 1936, showing new bone formation in the posterior clinoids and the clivus, and recalcification of the floor of the sella.

1931, was the first to make a clinical diagnosis of abnormal dilatation of the cavum septum pellucidum and cavum vergæ. He reported two cases in which the cavities were dilated to an abnormal degree, sufficiently to produce compression of the pyramidal tracts, and marked mental symptoms. He stated that ventriculograms, in such conditions, appear to be pathognomonic of congenital cysts of the cavum septum pellucidum and cavum vergæ, and that with operative treatment a permanent cure can probably be expected.

Van Wagenen and Aird suggest a practical classification of dilatations of the cavum septum pellucidum and cavum vergæ, namely: "(a) noncommunicating, or those that have not established a fistula into the third, or lateral ventricles; (b) communicating, or those that have a fistulous communication with the ventricular system; (c) secondary or acquired dilatation, communicating in type, where the dilatation is but a part of a superimposed internal hydrocephalus from whatever cause." The noncommunicating dilatations may cause such symptoms as are produced by tumors: mental changes, headaches, vomiting, motor paralysis, etc. Communicating dilatations do not produce clinical symptoms, since there is no pressure to occlude the interventricular foramina. Consequently, the con-

Report of Case

History.—H. K., male, aged thirty-eight, a successful traveling shoe salesman, enjoyed good health up to June, 1931. He first began to have numbness in the right hand, and a few weeks later developed a numbness in the right leg. Early in October a motor weakness appeared in the right extremities. The patient continued to grow worse, became forgetful, irritable, and emotionally unstable, crying and laughing for little or no apparent cause.

On November 1, 1931, the following essential neurological findings were noted: The eyegrounds and cranial nerves were normal, there was incoördination and motor weakness in the right extremities, the deep reflexes were increased, and the abdominal reflexes were decreased on the right. A spinal tap showed the pressure was elevated to 420 millimeters of water pressure. It was decided that he had a left frontal neoplasm and he was taken to a well known clinic for surgical treatment. At the clinic the symptoms continued to increase. He became confused, drowsy, incontinent, and was unable to walk. Skull x-rays showed marked erosion of the sella turcica. A diagnosis of tumor of the anterior corpus callosum was made and, since operative treatment was not recommended, he was discharged.

Examination.—The patient was transferred to the University Hospital, November 13, 1931, in a stuporous condition. He was confused and under the delusion that he had been in an automobile accident one week previous. During the examination he laughed frequently, talked loudly, exhibited Witzelsucht and showed marked paraphasia and motor apraxia. The general physical examination was essentially negative.

CYST OF THE SEPTUM PELLUCIDUM—BERKWITZ

The temperature and pulse rate were normal; the blood pressure was 130/80.

Ophthalmoscopic examination revealed mild optic neuritis with engorgement of the retinal veins. Nystagmus was present on looking laterally. All the deep

day he left the hospital, he was able to walk, feed himself, and talk rationally.

From the ventriculograms, at first a tumor rather than a cyst of the septum pellucidum was considered and two series of eight deep x-ray treatments were



Fig. 3. Ventriculogram, November 17, 1931, anterior-posterior view. Supine roentgenogram showing dilatation of the lateral ventricles with a mass in the midline compressing and separating both ventricles.



Fig. 4. Ventriculogram, November 17, 1931, right lateral view. Supine roentgenogram showing dilatation of both ventricles with poor filling of the anterior horns.

reflexes were increased, but more on the right side. The right abdominal reflexes were decreased, and the Babinski test was present on the right. The patient had coarse tremors of the hands, marked incoördination, and was unable to stand without support.

The blood and spinal fluid Wassermann tests were negative. The spinal fluid was clear, no cells were present and the Nonne test was negative. X-rays of the skull showed a marked thinning out of the posterior clinoid processes, and some irregularity and haziness in the floor of the sella and the neighboring portion of the middle cranial fossa.

Course in Hospital.—As a last resort, a ventriculography was performed by Dr. William Peyton, Head of the Neurosurgery Department, on November 17, 1931. The ventricular pressure was greatly increased; about eighty-five cubic centimeters of clear fluid was replaced by forty-five cubic centimeters of air in the left ventricle, and some methylene blue dye was injected. About thirty-five centimeters of clear fluid was removed from the right ventricle and replaced by twenty-five cubic centimeters of air. No methylene blue dye was recovered in the right ventricle, indicating the presence of a block between the lateral ventricles. The ventriculograms showed both ventricles were markedly enlarged. Instead of a narrow vertical space which normally represents the septum pellucidum, a large filling defect, 5 by 4.5 centimeters, was present.

For two days after the ventriculography the patient's condition remained the same. He tried to get out of bed frequently and to tear the bandage off his head. The third day (November 19) he appeared brighter and less confused. On the sixth day (November 22) he became more rational, cheerful, and cooperative; and on the tenth day (November 27), the

given to the head from November 22 to December 7, 1931, and from January 27 to February 15, 1932. Since there was such a definite improvement even before the first x-ray treatment, and since very little, if any, improvement can be expected from deep x-ray treatments for at least two or three weeks, it is beyond all reasonable doubt that the x-ray treatment was not responsible for the rapid recovery.

Since leaving the hospital the patient has enjoyed good health. He returned to his occupation and is working regularly and efficiently. On October 31, 1936 (five years after he left the hospital) x-rays of the skull were retaken. They showed that the floor of the sella remained somewhat deepened and larger than normal, but instead of erosion of the sella turcica there was a considerable filling in of bone, especially in the posterior clinoids and clivus.

Comment

Noncommunicating cysts of the septum pellucidum have been treated successfully by rupturing the cyst wall and producing a fistula into the lateral ventricles. This operation has been performed successfully by Dandy, Van Wagenen and Aird, Tönnis,⁵ and Kötter³ by a transcorpus callosal or a transventricular approach.

Van Wagenen and Aird suggest a less radical procedure be tried first, namely, making a burr hole opening over the right precentral area under a fluoroscope if necessary, tapping the noncommunicating dilatation one or more times with a brain needle, going through an air-filled ventricle.

It is possible for the cyst to rupture spontaneously, since the walls are very thin. Artificial openings between the cysts of the septum pellucidum and the lateral ventricles have been found in autopsied specimens.² Two cases have been reported by Van Wagenen and Aird, and Laubenthal,⁴ in which they believe communicating cysts were brought about by spontaneous rupture of the cyst wall. Van Wagenen and Aird's case was that of a man, aged thirty-nine years, who had mental symptoms and attacks of unconsciousness. The only neurological findings were a convergence of the right eye and a questionable positive Romberg. The patient recovered after encephalograms were made. The encephalograms showed air in the cavum septum pellucidum which they believe gained entrance through spontaneous rupture of the cyst wall by sudden changes in the intraventricular pressure at the time of the encephalography. They state that Stookey reports a similar experience which leads him to believe that the walls of a septal dilatation were ruptured at the time of an encephalography.

Laubenthal's case was that of a child who developed many neurological findings, and then improved without treatment. Ventriculograms were not made until after the child's condition improved, and these showed a large communicating cyst of the septum pellucidum. Laubenthal believed that the walls of a communicating cyst ruptured spontaneously, and recovery took place without medical treatment.

The case reported in this paper apparently is also that of the transformation of a noncommunicating into a communicating cyst. The clinical symptoms appeared approximately six months before ventriculography was performed. The clinical picture, consisting of mental disturbances, motor paralysis, drowsiness and motor apraxia with increased cerebrospinal fluid pressure, is characteristic of the corpus callosum syndrome described by Alpers and Grant.¹ The

cyst apparently did not rupture immediately, since no air entered the septum pellucidum at the time of the ventriculography. Whether sudden changes of the interventricular pressure, or irritation of air injected was responsible for the rupture of the septal wall cannot be determined, but the rapid improvement immediately following the ventriculography with no recurrence of symptoms after seven years leads the writer to believe that a noncommunicating cyst of the septum pellucidum was ruptured. By repeating the pneumography, positive proof of this diagnosis could be established beyond doubt. The patient refused to give permission for this, but the history, the findings, and the remarkable recovery support the writer's conclusion.

Conclusion

1. Noncommunicating dilatations of the cavity septum pellucidum and cavum vergæ may cause clinical symptoms similar to corpus callosum tumors.

2. The diagnosis may be suspected clinically, but must be confirmed by means of pneumography.

3. The treatment is to convert the cyst into a communicating dilatation by opening it into the ventricular system. Three clinical cases have been reported in the literature where rupture of the walls occurred spontaneously. The writer presents a fourth case. In this case complete clinical recovery followed ventriculography.

Bibliography

1. Alpers, B. J., and Grant, F. C.: The clinical syndrome of the corpus callosum. *Arch. Neurol. and Psychiat.*, 25: 67-86, 1931.
2. Dandy, W. E.: Congenital cerebral cyst of the cavum septi pellucidi (fifth ventricle) and cavum vergæ (sixth ventricle). *Arch. Neurol. and Psychiat.*, 25:44-66, 1931.
3. Köster, E.: Über das Cavum Septi Pellucidi und andere Veränderungen des Septum Pellucidum. *Nervenarzt*, 9: 392, 1936.
4. Laubenthal, F.: Über Veränderungen des Septum Pellucidum. *Nervenarzt*, 10:401-411, 1937.
5. Tönnies, W.: Kongenitale Cyste des Septum Pellucidum. *Zentralbl. f. Chir.*, 62:1018-1021, 1935.
6. Van Wagenen, W. P., and Aird, R. B.: Dilatations of the cavity of the septum pellucidum and cavum vergæ. *Am. Jour. Canc.*, 20:539-557, 1934.
7. Vergæ: Quoted by Dandy.²

Self-Protected—Few physicians die of tuberculosis despite the fact that they are constantly exposed to it. Knowledge defends them as it may yet defend other groups in the population when properly educated in self-protection.

CASE REPORTS

TERMINAL ILEITIS WITH EXTENSION INTO THE CECUM FOLLOWING NONPERFORATING ABDOMINAL TRAUMA

J. S. BLUMENTHAL, M.D., and REUBEN BERMAN, M.D.

Minneapolis, Minnesota

INTEREST in localized areas of chronic inflammation of the small bowel was revived in 1932 by Crohn, Ginsburg and Oppenheimer.² These writers named the condition "regional ileitis" although most of their cases conformed to the designation "terminal ileitis." Subsequent studies have demonstrated similar lesions elsewhere in the small bowel and in the colon as well.^{3,4} Etiological factors suggested include tuberculosis, peritonitis from various sources, syphilis, low grade bacterial infection. Inflammatory stenosis of the bowel following abdominal trauma is well known.^{5,11} We have, however, found no reports in recent medical literature of blunt non-perforating trauma as the cause of the type of intestinal pathology described by Crohn and his associates.

Bowel injuries from non-perforating abdominal trauma are of great surgical and medico-legal interest. Such injuries are not rare. The injury to the bowel wall may be mild, consisting only in a tear through mucosa or serosa, or severe enough to sever completely the bowel, spilling intestinal contents into the peritoneal cavity. Bruising of the bowel wall with hemorrhage but no actual rent of the bowel may occur. The site of injury may be anywhere in the gastrointestinal tract. Ruptures of the stomach,⁵ duodenum,¹¹ small intestine,¹⁰ appendix,⁹ and large intestine¹ have been reported. The terminal ileum lying relatively close to the abdominal wall and partially obstructed by the ileocecal valve is peculiarly vulnerable to trauma. A wave motion set up in the liquid contents of the bowel by a violent blow may rebound from the valve and cause a summation of forces in the terminal ileum. The perforation may occur hours or days following the trauma.⁶

This report deals with a patient in whom terminal ileitis with extension of the inflammation into the cecum developed following blunt trauma to the abdominal wall.

The patient is a white man, twenty-four years old, injured July 6, 1937. His past history is distinguished by many years of uninterrupted good health. Throughout grade and high school he did not miss a day because of illness. He took no sick leave in six years of work. As a child he had measles, epidemic parotitis, pertussis. He uses no liquor or tobacco. His parents, four brothers and three sisters, are living and well. One brother died at eighteen years of Hodgkin's disease. He is married and has three sons, all well. The injury occurred while he and an assistant were

lifting empty wooden crates weighing 35 pounds onto a warehouse truck. In raising one of the crates they failed to clear the pile of boxes on the truck and the crate dropped, striking the patient in the right lower quadrant of the abdomen. He suffered immediate severe pain in the region and was incapacitated for work the remainder of the day. The pain lasted about ten minutes and he then was able to go to his car unassisted and drive home. At no time was he unconscious. In spite of pain of short duration recurring every few hours he returned to work the following day. These pains continued until his first operation. He consulted one of us (J. S. B.), on July 15, 1937, because of the pain in the right lower quadrant. At the first examination the only positive finding was a partially absorbed hematoma 3 cm. in diameter located at McBurney's point. Stool examination revealed no occult blood, the urine was negative, white blood count 7,500. On July 19 he was awakened early in the morning with severe pain in the right lower quadrant which soon became intolerable. His temperature was 102 F., pulse rapid and thready, WBC 12,500, urine negative. Acute appendicitis appeared to be the most likely condition and the patient was operated upon later that morning at the University of Minnesota Hospital. A normal appearing appendix was removed. The cecum was normal. Further exploration revealed inflammation of the terminal ten centimeters of the ileum. In this region the bowel was thickened, reddened, and indurated. The lesion included the superior surface and extended around half the bowel circumference. No stenosis and no perforation was found. Peritoneal cultures were taken and with no further ado the abdomen was closed. The cultures were negative. After a rather stormy postoperative course of eighteen days he was discharged with a profusely draining purulent wound. Gastro-intestinal x-ray studies were done September 1, 1937, at the University Hospital. These showed narrowing of the terminal seven centimeters of ileum with a sinus tract extending medially and inferiorly 4 cm. from the midportion of the lesion. The patient continued to have recurrent abdominal pain. Another gastrointestinal study on January 18, 1938, showed a classical "string" sign in the terminal nine centimeters of ileum plus a ragged filling defect occupying the medial inferior portion of the cecum (Fig. 1). A two-stage resection of the distal ileum, cecum and ascending colon was undertaken by Dr. A. W. Hoaglund. At the first stage, January 20, 1938, the terminal ten centimeters of ileum was thick, red and firm. The cecum was less mobile than normal and its medial wall was thickened and hard. The entire ascending colon appeared to be redder than normal. The ileum was divided about 40 cm. from the cecum, the cut ends closed, and a side-to-side anastomosis performed from ileum to transverse colon. Following this operation the patient had an uneventful immediate course but after two weeks began again to have abdominal pain, now aggravated by diarrhea. On March 4, 1938, the abdomen was reopened and the

CASE REPORTS

short circuited terminal ileum, cecum, and ascending colon were removed. At this time the mass in the cecum was smaller and the colon more normally mobile. The ascending colon had lost its inflammatory appearance. The patient's immediate recovery was without incident but he has continued to have diarrhea with recurrent attacks of fever of 100 to 102 F. He has not recovered to the point where he can return to work. Careful microscopic and bacteriologic examinations of the diarrheic stools failed to reveal amebæ or *B. dysenteriae*. Blood Wassermann tests were negative. The Mantoux test was negative. The patient's claim for compensation on the basis of trauma was allowed by the insurance company.

The operative specimen removed March 4, 1938, consisting of terminal ileum, cecum and ascending colon, was examined by Dr. N. H. Lufkin. The ileum measures 33 cm. from ileocecal valve to the point of amputation. There are a number of old adhesions at the site of the removed appendix. The segment of colon measures 20 cm. along the mesenteric border. The serosal surfaces of both colon and ileum are greatly roughened by recent but definitely fibrous adhesions. These are red and injected. No fibrin is found. The walls of the small intestine feel indefinitely thickened, but the colon on palpation seems normal. In the posterior portion of the cecum on the mesenteric border and within the mesentery are a number of moderately enlarged fairly soft lymph nodes. After fixation the bowel is divided along the antimesenteric border. The ileum seems normal except for increased thickness. Two centimeters from the valve the ileum becomes extraordinarily indurated although the lumen of the bowel is not reduced in caliber. The extreme induration extends to include the orifice of the ileocecal valve. The lips of the valve are extremely rigid with the effective orifice consisting of a slit 12 mm. long and 2 to 3 mm. wide. The stenosis is of a high degree and because of the rigidity incapable of distension. The inverted appendiceal stump is found at a point 2 cm. from the ileocecal valve. In this region the mucous membrane is hypertrophic and verrucous. On the side of the cecum opposite to the valve the mucosa is thickened and indurated, with many closely placed verrucous projections. The margins of the indurated cecum blend gradually into normal bowel distally. The bowel beyond 3 cm. from the ileocecal valve appears entirely normal.

Microscopic.—Sections from the ileum at a distance from the cecum show no changes from normal. Sections of ileum near the ileocecal valve show normal mucosa and muscularis mucosæ. The submucous connective tissues are considerably thicker and more fibrous than normal and there are focal infiltrations of lymphocytes in this layer associated with mild definite active proliferation of the connective tissue cells. The muscular coat is not thickened and practically free of inflammation. The serosa is normal. At a point still closer to the valve the mucosal coat of the ileum is definitely atrophic. The muscularis mucosæ is indistinct and there is extreme fibrosis of the submucous layer. There are large foci of lymphocytes which do not appear to be Peyer's patches. There are also scattered polymorphonuclears, plasma cells and eosinophiles. The muscularis here is greatly thickened, apparently by simple hypertrophy. The serosal coat is likewise thickened and contains dense lymphocytic foci. Sections from the more normal portions of the cecum show no particular changes. In a thickened portion there is some muscular hypertrophy with considerable edema between the muscle coats. This is associated with scattered infiltration of lymphocytes and plasma cells with a few polymorphonuclears. There are small areas of active proliferative changes on the part of the connective tissues but these are not especially conspicuous. Sections from the ileocecal valve and surrounding tissues show marked hypertrophy of the mucosa



Fig. 1. Gastro-intestinal study of January 18, 1938. Plate taken at five hours showing narrowing of terminal ileum and ragged filling defect of medial inferior margin of the cecum.

with the formation of small papillary structures. There is marked increase in submucous fibrosis with numerous perivascular foci of lymphocytes. Lymphoid follicles are extraordinarily conspicuous. There are a few fairly well circumscribed foci of proliferative inflammation associated with giant cells. These lesions do not resemble those of tuberculosis. In the serosal coats there is somewhat less fibrosis than in other sections but dense perivascular foci of lymphocytes are frequent. The lymph nodes show conspicuous lymphoid follicles at the periphery and increase of lymphocytes throughout. There is no evidence of immaturity of the lymphocytes. Polymorphonuclears and plasma cells are unusually numerous throughout the lymph nodes.

Diagnosis.—1. Terminal ileitis with extension into the ileocecal valve and cecum.

2. Chronic stenosis of the ileocecal valve with partial obstruction of the ileum.

3. Hyperplastic mesenteric lymphadenitis.

Discussion.—The pathological appearance of the lesion in the ileum is that of a terminal ileitis. Other etiological factors of stenosis such as tuberculosis, amebic dysentery, and syphilis, have been ruled out. From the serial roentgen examinations this lesion appears to be primary and the later picture of inflammation in the cecum can best be explained as an extension of the process. It is impossible to prove that the trauma actually caused the lesion. But the evidence in this case favors trauma as the etiological agent. The severity of the injury is attested by the large hematoma in the right lower quadrant over the site of the lesion. There were no symptoms up to the moment of injury,

CASE REPORTS

and from that moment on the patient has suffered the symptoms characteristic of this disease.

Summary.—A case of terminal ileitis with extension into the cecum is reported. The distal ileum and proximal colon were excised. The symptoms were initiated by blunt trauma to the abdomen.

Bibliography

1. Brahdry, Leopold, and Kahn, Samuel: Trauma and disease. Philadelphia: Lea and Febiger, 1937, p. 186.
2. Crohn, B. B., Ginzburg, L., and Oppenheimer, G. B.: Regional ileitis. *Jour. A.M.A.*, 99:1323-1329, 1932.
3. Crohn, B. B., and Rosenak, B.: A combined form of ileitis and colitis. *Jour. A.M.A.*, 106:1-7, 1936.
4. Dixon, C. F.: Regional ileitis. *Ann. Surg.*, 108:857-866, 1938.
5. Glassman, Oscar: Subcutaneous rupture of the stomach, traumatic and spontaneous. *Ann. Surg.*, 89:247-263, 1919.
6. Inlow, Wm. dePrez: Secondary or late perforation of small intestine from trauma. *Arch. Surg.*, 21:97-112, 1930.
7. Maier, Otto: Der Krankheitsbild der traumatischen Darmstenose. *Arch. f. klin. Chir.*, 132:212-215, 1924.
8. Schloffer, Herman: Ueber traumatische Darmverengerungen. *Mitt. a. d. Grenzgeb. d. Med. u. Chir.*, 7:1-21, 1901.
9. Shutkin, Michael W., and Wetzler, S. H.: Traumatic appendicitis. *Am. Jour. Surg.*, 31:514-520, 1936.
10. Vergoz, C., Ricard, E., and Homer, J.: Contusions and ruptures of the small intestine in the course of closed traumatic injuries of the abdomen. *Rev. de Chir.*, 72:723-759, 1934.
11. Wyatt, O. S.: Rupture of duodenum (in a three-year-old child). *Minn. Med.*, 21:792, 1938.

DIVERTICULA OF THE STOMACH

WALTER HALLORAN, M.D.

Jackson, Minnesota

DIVERTICULA of the stomach are rare. Among all portions of the digestive tract the stomach is the rarest location of diverticular formations. They are usually found near the cardia, less frequently near the pylorus, while those of the median portion of the stomach along the greater curvature are even less frequently seen.

The following case is reported.

The patient is a woman of fifty-four. Aside from the fact that she had had chronic bronchitis for the past fourteen years and slight attacks of gaseous eructations, there was nothing unusual in her history before May, 1935, when she had an attack of abdominal pain and jaundice which lasted for a few days and subsided. In September of the same year she suffered another attack and was first seen by us. At that time she had been ill for four days with abdominal pain, intermittent in character and very severe, mostly located to the left of the midline. This was associated with vomiting of large amounts which persisted until time of admission. Two months previously she had had right upper abdominal pain, more steady in character and associated with jaundice but no vomiting, which lasted for a few days. She had lost twenty-five pounds during the past two months.

The patient complained of feeling tired and weak, moderate abdominal pain, and said that she had been vomiting all food for the past two days. There were coarse râles over both lungs. The abdomen showed moderate general tenderness and the liver edge extended about three fingers breadth below the costal margin. There was a smooth rounded mass about the size of a small orange in the right hypochondrium which appeared to be attached to the liver. Otherwise the physical findings were essentially negative. There was no jaundice. The temperature ranged from subnormal in the morning to 99.5 in the afternoon. The pulse was 75, respirations 20, blood pressure 120/70, and the urine showed a faint trace of albumin. The leukocyte count was 10,000. X-rays of the gallbladder showed no filling. A diagnosis of cholecystitis was made. She left the hospital after four days much improved and was to return in ten days for operation. The patient, how-

ever, did not return until one year later, when she was brought in acutely ill. About a week before admission she had become acutely ill with a cough, elevation of temperature, and a dull pain in back and abdomen. She noticed that she was jaundiced first the day before admission. She had vomited several times a day for the past two or three days, rather large amounts, and had a chill the day of admission. There was marked icterus, the skin and tongue were dry, temperature 103, pulse 140, respirations 48. She was coughing a great deal and expectorating thick yellow sputum. There were coarse râles over both lungs but no areas of consolidation. The heart was rapid but otherwise normal. A tender, smooth, rounded mass could be felt in the right upper abdomen. Leukocytes numbered 26,000; the urine contained bile and a faint trace of albumin. With forced fluids and ice to the abdomen her condition improved and the jaundice cleared up and the temperature became normal. However, she was still coughing a great deal and the mass in the right upper quadrant persisted. Because of the pulmonary condition it was decided to do a cholecystotomy only.

On opening the abdomen the liver was three fingers breadth below the costal margin with a thickened rounded edge. A smooth mass was attached to the edge and under surface of the liver in the usual location of the gallbladder. It was pink in color and about the size of a hen's egg and covered by omental adhesions. It was densely adherent to the under surface of the liver and gallbladder and was connected to the anterior and upper aspect of the stomach at the pylorus by a pedicle about 2 cm. in length and the size of a lead pencil. The sac was aspirated and contained a thin chylous fluid. It could be compressed slowly. No effort was made to dissect the mass from the liver, but it was resected leaving that portion attached. The wall was about 0.5 cm. in thickness and lined by mucous membrane. There was no connection between the interior of the sac and the gallbladder. The pedicle was ligated at the gastric end and the stump inverted. The gallbladder was contracted and thick walled. There were no stones in the gallbladder or ducts. The gallbladder was drained. She had an uneventful convalescence and left the hospital on the fifteenth day. It was evidently a true diverticulum of the stomach which had become attached to the liver and gave rise to the symptoms simulating cholecystitis.

HISTORY OF MEDICINE IN MINNESOTA

HISTORY OF MEDICINE IN RAMSEY COUNTY

BY J. M. ARMSTRONG, M.D.

(Continued from May issue)

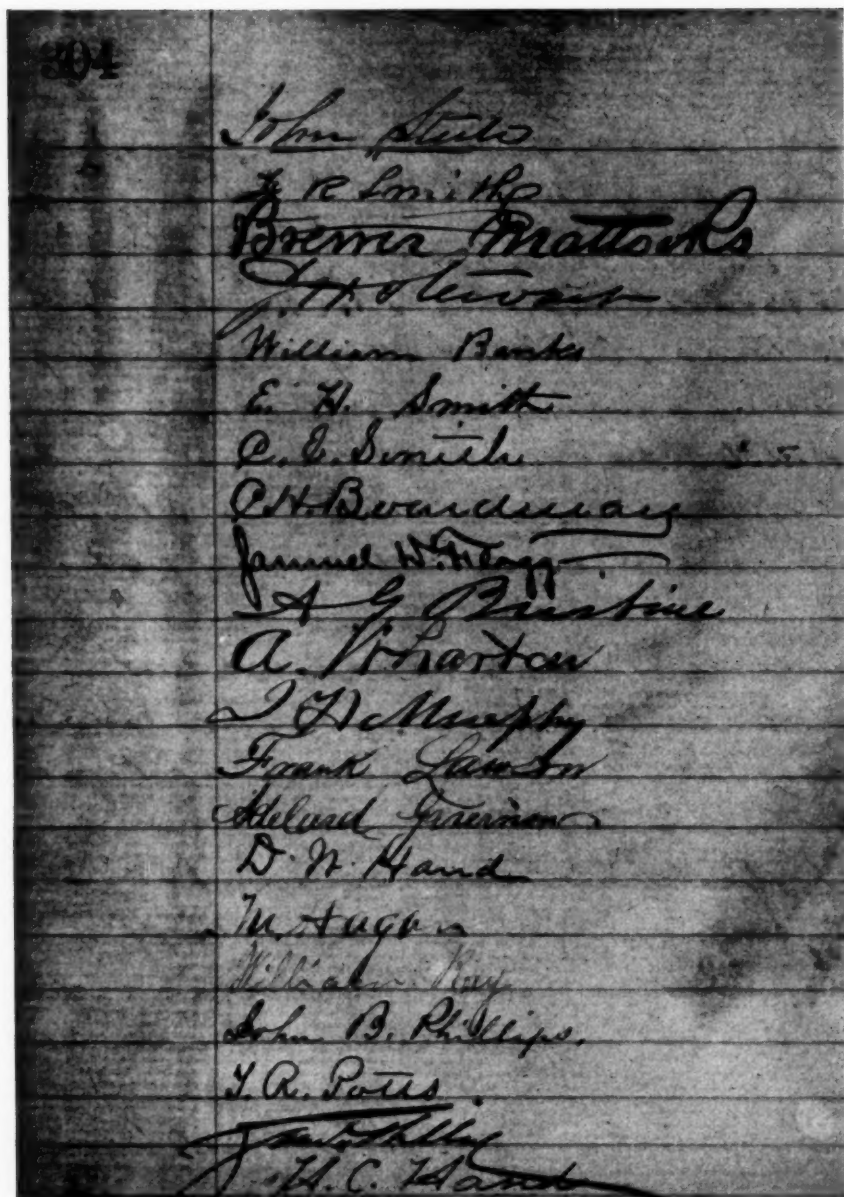
The Ramsey County Medical Society

Meetings of an informal nature among physicians had been held in Saint Paul since the dissolution of the Saint Paul Academy of Medicine and Surgery in 1866, but no formal organization was attempted. The constitution of the State Society of 1869 demanded the organization of county societies. Those of our local physicians who took the initiative in the formation of the Society were Dr. Charles H. Boardman and Dr. E. Hermann Smith, apparently at the instigation of Dr. Samuel Willey. On February 14, 1870, eleven physicians met in Doctor Smith's office and formed the Ramsey County Medical Society. Doctor Willey acted as temporary chairman, and the following officers were elected:

Daniel W. Hand—President
Alfred Wharton—Vice President
William Banks—Corresponding Secretary
Chas. H. Boardman—Recording Secretary
Samuel D. Flagg—Treasurer

After some discussion, the present name of the Society was adopted, it not being thought advisable to revive the older organization. Drs. Flagg, Banks, and Lawson were appointed a committee to draft a constitution and by-laws, and the Society adjourned to meet one week later. At this second meeting, twelve members signed the constitution, and the secretary was instructed to secure the signatures of other physicians who wished to join. After the following meeting, it was agreed that further additions to membership should be by ballot. The signatures of twenty-two men were obtained before the third meeting. These men are regarded as the founders of the society. The first member admitted by ballot was Dr. Alexander J. Stone, who came to Saint Paul from Stillwater early in the year. The next members were Drs. Charles Hill and William W. Mayo. Both of these men were elected to the State Legislature in 1872, and practiced medicine in Saint Paul as partners during their term of office. In 1873, Doctor Hill returned to Pine Island, and Doctor Mayo to Rochester, where both remained till their deaths. The names of the founders and the order in which they signed the constitution are: William Baldwin, David Day, John Steele, F. R. Smith, Brewer Mattocks, J. H. Stewart, William Banks, E. H. Smith, C. E. Smith, C. H. Boardman, S. D. Flagg, A. G. Brisbane, A. Wharton, J. H. Murphy, Frank Lawson, Adelard Guernon, D. W. Hand, M. Hagan, William Ray, John B. Phillips, T. R. Potts, and Samuel Willey. The Society has portraits of these men, but they were taken at a later date than the year of the founding.

For the first two years of its career the society was in a flourishing condition. Then evidence of decay became apparent, and at the end of its fifth year it practically ceased to exist. After four years of inactivity it was revived in 1879, and



SIGNATURES OF MEMBERS WHO SIGNED THE CONSTITUTION.

flourished till 1882 when meetings were fewer and less well attended till 1889. A revival then occurred and the Society had been successful ever since, though there were periods until the year 1900 when attendance at the meetings was smaller than it should have been. Up to the beginning of this century the total number of those admitted was 261, the largest number having been added in 1884 when twenty-three new members were admitted. In 1900, the members numbered 135. At the present time the membership is about three hundred.

The minutes of the Society from the beginning reveal that the meetings were

HISTORY OF MEDICINE IN MINNESOTA

harmonious with but few exceptions. Many interesting papers were presented and intelligent discussion followed the papers and cases presented. At first, the meetings were held in the physicians' offices, and later in the rooms of the Saint Paul Medical School and in various hotels. In 1896, the Society secured rooms on the third floor of the old Lowry Arcade Building which also housed the beginning of the Society library and a laboratory. These rooms were occupied till the present Lowry Building was erected in 1912. Space for the Society's activities was then provided on the thirteenth floor. This was another step in advance and these rooms were occupied till the completion of the new Lowry Medical Arts Building, when the present adequate and attractive quarters were occupied in December, 1930, for which the Society, for the third time, is indebted to the owners of the building.

Among those who have attained prominence in medicine the following* may be mentioned:

1870-1880

Drs. Samuel Willey, Daniel W. Hand, Franklin R. Smith, Chas. E. Smith, Alexander J. Stone, Samuel D. Flagg, John H. Murphy, Alfred Wharton, J. H. Stewart, Francis Atwood.

1880-1890

Drs. Charles A. Wheaton, Edouard Boeckmann, Arthur B. Ancker, Everton J. Abbott, Justus Ohage, Gottfried Stamm, Frederick Dedolph, John F. Fulton, Cornelius Williams, James A. Quinn, Jay Owens, Wm. Davis, Anton Shimonek, Perry H. Millard, Talbot Jones, Daniel Leasure, C. Eugene Riggs, Albert E. Senkler, Parks Ritchie, James Davenport, Chas. B. Witherle.

1890-1900

Drs. Arnold Schwyzer, Arthur Sweeney, Henry J. O'Brien, H. L. Nippert, Charles Lyman Greene, H. Longstreet Taylor, Jacob E. Schadle, Archibald MacLaren, Burnside Foster, John L. Rothrock, James S. Gilfillan, Arthur J. Gillette, Warren A. Dennis, E. W. Buckley, A. R. Colvin, Harry P. Ritchie, Gustave A. Renz, Geo. E. Senkler, Haldor Snévé, Thomas McDavitt, John T. Rogers, Walter Ramsey, James T. Christison, John B. Brimhall, Robert O. Earl, Erik M. Lindholm.

The reader will note that the names of none who came later than the year 1900 are included. In addition, may be mentioned Dr. Harry C. Hand who first brought a knowledge of microscopic pathology to Minnesota and who is quoted in Gray's Anatomy (6th edition) for observations on the anomalies of the cardiac valves; Dr. Justus Ohage who performed the first cholecystectomy in this country in 1886; and Dr. Anton Shimonek, who first brought here a knowledge of bacteriologic technic and claimed to have performed the first interval operation for appendicitis in the United States. Of those who had some distinction in other activities may be mentioned Dr. Daniel Leasure, who was a Brigadier General of Volunteers in the Civil War; Dr. Percy Vittum, who wrote a very pleasant little book of poems; Dr. Henry F. Hoyt, the author of an interesting autobiography under the title, "A Frontier Doctor"; Dr. Egil Boeckmann who has served for eight years as Regent of our State University; and Dr. Charles B. Witherle, who after leaving here became professor of nervous and mental diseases in the University of Maine, and Dr. Edouard Boeckmann, who designed the first steam pressure sterilizer.

Laboratory of the Ramsey County Medical Society

With the advent of Dr. H. C. Hand in 1871, the interest in both gross and microscopic pathologic anatomy began to play an important part in the meet-

*The names are arranged in the decade in which they came to Saint Paul.

ings of the Society, and Doctor Flagg in his annual presidential address in 1872 touched on the desirability of establishing a museum for the preservation of interesting pathologic specimens. In 1889, a Pathological Section of the Society was formed and preservation of specimens was begun. In 1896, when the rooms in the Lowry Arcade were obtained, a pathologic laboratory was established for the use of the members. This section of the Society was a very active one for some years, under the supervision of Drs. Hallowell, Renz, Shimonek, and Rothrock. When the laboratory of the Department of Health was established and the various hospitals put in laboratories, the need for the Ramsey County Society laboratory was not so urgent and it fell into more and more disuse. Finally, when the Society rooms were removed in 1913 the laboratory was abandoned as it was then little used and had served its purpose. The remaining specimens of the collection were presented to the laboratory of the Department of Health. While this laboratory section of the Society existed it was of great utility to the members, and an activity which few county medical societies possessed at that time.

Laboratory for Making Catgut Ligatures

In speaking above of the pathological laboratory, no mention was made as to how funds were provided to maintain it during its later years. Dr. Edouard Boeckmann had perfected a method of preparing catgut for surgical ligatures for his own use, and as the product soon began to be used by other surgeons, both here and elsewhere, he generously turned over the manufacturing and sale of it to the laboratory committee in order that the laboratory might be financed. All these years, the Society has continued to prepare and sell pyocetanin catgut which has been and is now widely used by surgeons throughout the country. With the abandoning of the pathological laboratory the profits accumulating from this activity now form the principle part of our building fund.

The Saint Paul Medical Journal

The proceedings of our Society may be found in the *Northwestern Medical and Surgical Journal* during the life of that journal, from 1870 to 1874, and from 1881 to 1899 in the *Northwestern Lancet*. At the annual meeting of the Ramsey County Medical Society in January, 1898, it was moved that a committee of five be appointed to consider the advisability of the Ramsey County Medical Society controlling its own medical journal, and to report at a future meeting. In October, 1898, the committee made a lengthy report which ended with the following recommendation: "First, That the committee are of the opinion that the Society should publish a monthly journal, the first number to be issued January, 1899. Second, That the committee recommend that the publication for the first year be delegated to the Committee on Publication with full power to act, with the understanding that the said committee assume all financial liabilities whatsoever."

There was considerable opposition manifested during the discussion following this report, but it was adopted by a small majority. The *Saint Paul Medical Journal* made its appearance in January, 1899, and in November, 1899, was made the official organ of the Society. Although the name of Dr. Edouard Boeckmann does not appear in connection with the starting of the journal, one may state that the idea of starting it originated with him and it was he who agreed to finance it for its initial year.

The *Saint Paul Medical Journal* was a success both financially and scientifically

HISTORY OF MEDICINE IN MINNESOTA

from its beginning till its demise in 1917, when the State Association began the publication of *Minnesota Medicine*. In order to consolidate the medical activities of the state the Saint Paul journal withdrew and offered its resources to the State Association. To those of the Society whose membership began after this journal ceased publication, I suggest that a perusal of it would be profitable and instructive. Dr. Burnside Foster edited the journal and ably conducted it till the time of his death. His editorials may be read with profit today, and no doubt had a great influence in promoting ethical medicine and raising the standard of medical journalism in the United States. Dr. H. Longstreet Taylor was the first business manager, and ably coöperated with Doctor Foster in making the journal a success. Members of the Society received the journal gratis. But few county medical societies then or since have had the temerity to publish a journal of their own.

Library of the Ramsey County Medical Society

For a number of years, the library was supported by voluntary subscriptions. After the *Northwestern Lancet* moved to Minneapolis the exchanges of that journal ceased to come to the library. In 1899, they were replaced by the exchanges of the *Saint Paul Medical Journal*. An annual appropriation for the library was made by the laboratory committee from its profits, and also from the profits of the *Saint Paul Medical Journal*. After the demise of the *Saint Paul Medical Journal*, the burden of supporting the library was born by the laboratory committee with a small appropriation from the Society's funds. The library now receives part of the exchanges from *Minnesota Medicine*.

The library has prospered exceedingly well, but like every similar institution it has always been in need of more funds as its activities expanded. Finally, in 1929, the Society realized that permanent adequate financial provision must be made for its support. In addition to the small annual contribution from the Society an annual appropriation from the income of the building fund of the Society was set aside for this purpose, and at the same time friends of the Society contributed nine memorial funds for deceased members. These latter funds have enabled the library to purchase books and to complete files of periodicals for which the funds of the Society were inadequate. The library keeps on file the important medical journals of the world and many society transactions, and endeavors to purchase any new books of merit which cannot be secured by other means. Many individual members of the Society and others, too numerous to mention here, have contributed books and journals. The library, since the autumn of 1929, has been under the administration of Miss Isabella T. Anderson, a trained librarian, and much progress has been made since then in cataloging and making accessible much material difficult to locate previous to that time. In addition to the library there is also housed in our rooms an extensive collection of antique and obsolete medical and surgical instruments and appliances which make an extremely interesting and instructive display. This collection was initiated during the presidency of Dr. Wallace H. Cole. Practically all this collection has been donated by Society members. The library also is attempting to form an historical collection of important medical books. Since funds are limited for this purpose the committee has largely confined its efforts in this direction to Medical Americana, and up to date has been fairly successful in this effort.

Too much praise for their foresightedness cannot be given to those members who formed the nucleus of the library, especially to Drs. H. Longstreet Taylor, J. L. Rothrock and Edouard Boeckmann, the last mentioned having been very

generous in his gifts of books, journals, funds, and counsel. A more extensive account of the origin of the library may be found in Doctor Taylor's article in *Minnesota Medicine* for October, 1931, (Vol. XIV, p. 906). The library now contains over 20,000 volumes.

Building Fund of the Ramsey County Medical Society

The accumulation of a building fund by the Society without outside aid and without expense to any member, is without doubt one of the most remarkable events in the history of this Society and would be of any society. Properly, one should introduce here or at the end of every one of the enterprises of this Society a biography of Dr. Edouard Boeckman, as his biography would include the story of the initiation of all the enterprises of this Society which have been of permanent value. In the year 1901, the American Medical Association met in Saint Paul for the second time, and a considerable sum of money was raised for its entertainment. It so happened that after that convention a sum of money somewhat over \$3,000 remained unexpended in the hands of the Entertainment Committee of which Dr. Charles A. Wheaton was chairman. As there was no means of ascertaining the method of disposing of this money, Doctor Wheaton kept it till March, 1904. After legal advice, he then turned it over to a committee of the Ramsey County Medical Society as a nucleus for a building fund. To this nucleus was annually added the small profits of the *Saint Paul Medical Journal*, while it existed, and the profits from the sale of catgut ligatures, except the sums appropriated for the maintenance of the library of the Society.

In 1926, Dr. F. E. Burch acquired in the name of the Society for the building fund the property on Ninth Street belonging to the Saint Paul Free Dispensary, and formerly the property of the Saint Paul Medical College. Aside from this generous acquisition through Doctor Burch the Building fund, one might say, is the result of the enterprise and practically the gift to the Society by Doctor Boeckmann. To show the appreciation of the unselfish devotion of Doctor Boeckmann to our Society, the Fund is now known as the "Boeckmann Library Building Fund." When the fund grows to a sufficient amount to build and maintain a proper home for the Society and care for its library, no doubt the Boeckmann Memorial will be erected.

Seal of the Ramsey County Medical Society

The following quotation from a letter written October 3, 1914, by Dr. Brewer Mattocks narrates the history of the seal of our Society:

"As to the seal of our Society, we had none until I was elected to an honorary membership on my return to Saint Paul (about 1900), when I was, with the remaining charter members, Drs. Flagg, C. E. Smith and Wharton, appointed to secure the pictures of the charter members. It then occurred to me that we should have a seal and I suggested the legend, "Dissect, observe and write," in the imperative. I wrote Arch-Bishop Ireland to Latinize the motto for me. He was kind enough to send his secretary to me with the suggestion that the imperative be changed to the infinitive, and wrote the legend as it now stands. Drs. Flagg, Smith, and Wharton united with me in presenting the seal to the Society, which was graciously accepted as such, and no questions asked from the surviving charter members."

The seal was designed by R. O. Sweeney. No doubt many of the older members remember Sweeney's Drug Store on what used to be called Bridge Square, at Kellogg Boulevard and Wabasha St.

Doctor Mattocks was mistaken, however, as to the surviving charter members.

HISTORY OF MEDICINE IN MINNESOTA

He should have included Doctor Boardman who was living in Brooklyn at that time.

Appended will be found a list of presidents of the Ramsey County Medical Society and the names of those who have held the positions of city and county physician, health commissioner, and coroner of Ramsey County.

Presidents of the Ramsey County Medical Society

1870 Daniel W. Hand*	1907 Everton J. Abbott*
1871 Alfred Wharton*	1908 Arthur Sweeney*
1872 Samuel D. Flagg*	1909 Arnold Schwyzer
1873 Charles E. Smith*	1910 Warren A. Dennis*
1874 John H. Murphy*	1911 James S. Gilfillan*
1875-79 Charles H. Boardman*	1912 Thomas W. Stumm*
1880 Martin Hagan*	1913 Charles J. Meade*
1881 Daniel Leasure*	1914 John M. Armstrong
1882 Daniel W. Hand*	1915 Harry P. Ritchie
1883 Albert E. Senkler*	1916 Henry L. Nippert*
1884 Charles A. Wheaton*	1917 James T. Christison
1885 James Davenport*	1918 Robert O. Earl
1886 Jay Owens*	1919 E. W. Buckley*
1887 Parks Ritchie*	1920 Charles N. McCloud*
1888 James C. Markoe*	1921 Frank E. Burch
1889-90 Justus Ohage*	1922 John C. Staley
1891 Talbot Jones*	1923 E. G. Sterner
1892 William Davis	1924 Carl L. Larsen
1893 John F. Fulton*	1925 E. M. Hammes
1894 Arthur B. Ancker*	1926 C. C. Chatterton
1895 C. Eugene Riggs*	1927 Francis J. Savage
1896 Arthur J. Gillette*	1928 E. M. Jones
1897 Jehiel W. Chamberlin*	1929 Wallace H. Cole
1898 James A. Quinn*	1930 F. C. Schuldt
1899 Edouard Boeckmann*	1931 O. W. Holcomb
1900 Gustav A. Renz*	1932 E. V. Goltz
1901 Cornelius Williams*	1933 Harry Oerting
1902 John L. Rothrock	1934 Frederick J. Plondke
1903 Angus McDonald*	1935 Robert M. Burns
1904 H. Longstreet Taylor*	1936 Albert G. Schulze
1905 Arthur W. Dunning*	1937 George K. Hagaman
1906 Burnside Foster*	1938 James N. Dunn

Dr. Alex J. Stone was elected in 1881, but as he was elected at that time president of the State Society he resigned and Dr. Daniel Leasure, vice president, succeeded to the office.

Those members who have served as president of the State Medical Association are:

1869-71 Samuel Willey*	1909-10 Cornelius Williams*
1880-81 Alexander J. Stone*	1912-13 Haldor Snévé*
1882-83 Perry H. Millard*	1915-16 John T. Rogers*
1888-89 Chas. A. Wheaton*	1918-19 A. J. Gillette*
1891-92 Parks Ritchie*	1921-22 C. Eugene Riggs*
1894-95 Justus Ohage*	1924-25 Archibald MacLaren*
1897-98 John F. Fulton*	1929-30 James T. Christison
1900-01 William Davis	1934-35 Francis J. Savage
1903-04 Chas. Lyman Greene*	1938-39 George A. Earl

HISTORY OF MEDICINE IN MINNESOTA

Saint Paul City Physician and Health Officer

1854 James D. Goodrich	June 1866-67 Thomas R. Potts
1855-56 Samuel Willey	1867-71 E. Brewer Mattocks
1857-59 John V. Wren	1871 Martin Hagan
1859 Jos. A. Vervais	1872-74 Thomas R. Potts
1860-62 Thomas R. Potts†	1874-80 E. Brewer Mattocks
1862-66 A. G. Brisbina†	1880-84 Stewart and Wheaton

*Deceased.

†Presidents—Saint Paul Academy of Medicine and Surgery.

City and County Physician

and Superintendent City and County Hospital (named Ancker Hospital after 1923)

1883-1923 Arthur B. Ancker	1925-35 Fred G. Carter
(died in office)	(resigned)
1923 John C. Staley	1935-1936 Seymour R. Lee
(resigned)	(died in office, Aug. 10, 1936)
1923-24 Jesse L. McElroy	1936- Thomas E. Broadie
(resigned)	(Aug. 25, 1936)

Saint Paul City Health Commissioner

1884 Henry F. Hoyt	1914-18 Justus Ohage
1885-88 Talbot Jones	1918-34 B. F. Simons
1888-95 Henry F. Hoyt	(died in office)
1895-99 A. J. Stone	1934 N. G. Mortensen
1899-1907 Justus Ohage	(resigned)
1907-11 G. A. Renz	1934- R. B. J. Schoch
1911-14 Howard Lancaster	

Coroners of Ramsey County

1849-51 Charles Bazille†	1862-64 O. F. Ford†
1851-52 Orlando Simons†	1864-66 Philip Scheigt†
(elected 1851)	1866-68 O. F. Ford†
1852-53 T. P. Reid†	1868-69 J. P. Melancon†
(elected October, 1852)	1869-70 H. M. Dodge†
1853 J. E. Fullerton†	1870-72 A. Guernon *
(elected 1853, refused to serve)	1872-74 Patrick McEvoy†
1853-55 Charles Bazille†	1874-78 Peter Gabrielsen†
(appointed, served till 1855)	1878-80 Chas. A. Steint†
1855 J. M. Castner†	1880-84 James Davenport
(appointed 1855)	1884-92 James A. Quinn
1855-57 Wm. H. Jarvis	1893-97 E. H. Whitcomb
1857 J. D. Goodrich	1897-1900 J. C. Nelson
1858-60 J. V. Wren	1901-09 A. W. Miller
1860-62 James M. Castner†*	1910-19 D. C. Jones
	1919- C. A. Ingerson

*Appointed in place of John Farmington, who did not qualify.

†Not physicians.

Ramsey County Physician

1851 Charles Rich	1858 Jos. A. Vervais
and probably others	1860-61 Thos. R. Potts*
(no definite appointee)	1862 Wm. Caine and C. D. Williams
1852 O. E. French	1862-66 A. G. Brisbina*
(apparently did not serve)	1866-67 J. H. Murphy and A. Wharton
1852 Carljos	1868 C. E. Smith
1853 J. D. Goodrich	1869 Guy D. Daly
1854 A. G. Brisbina	(resigned 1869)
1855 J. D. Goodrich	1870-74 C. E. Smith
1855-56 J. H. Murphy for St. Anthony	1874-82 Brewer Mattocks
1856-57 J. H. Stewart	1882-84 Stewart and Wheaton

*As president of the Saint Paul Academy of Medicine and Surgery.

(To be continued in July issue)

President's Letter

THE State Association meeting will be in progress as this issue goes to press and thanks are due to all who helped in preparations for it, particularly the Committee on Scientific Assembly, the groups from the University, the State Department of Health, the State Board of Control, the Local Minneapolis groups, Minneapolis City Health Department and the Department of Education. Hennepin County will be a fine host as usual and we wish to thank President Reynolds and the other officers, Chairman Cardle, all of his Committee and the Women's Auxiliary for the delightful entertainment they have arranged for this meeting.

The Medical Economics Committee is the largest in personnel of all our committees. It has a definite section in every issue of our State Journal and it deals with the changing social and economic conditions of the last decade coincident to the economic depression of world-wide range. The Committee has had to meet with active propaganda from governmental and liberal groups and it has been the responsibility of the Committee to judge what is and what is not of merit in the proposals set forth.

We have been fortunate in having an experienced and able Chairman, Dr. W. F. Braasch, whose long contact with organization work in the course of which he has served as President of the Association and delegate to the American Medical Association, has enabled him to conduct the work of the Committee with great force. He has had, of course, the help of an able committee composed of several important sub-committees. We have from time to time mentioned the work of these sub-committees and we wish to take occasion in this issue to express the appreciation of the Association to the Medical Advisory sub-committee composed of Dr. B. J. Branton, Dr. W. L. Burnap and Dr. W. H. Hengstler. This Committee has been a direct source of comfort to many of our members. Under Dr. Branton's leadership definite, tangible results have been produced as regards the methods of handling delicate situations and also in promoting a better understanding between the Bar Association and the Medical Association.

Dr. T. H. Sweetser, Chairman of the State Health Relations sub-committee, has worked as hard as anybody in the Association. No one has been more faithful in attending meetings or more conscientious in his handling of difficult situations. His committee has done much toward securing the best possible coöperation between our tax-supported agencies and the private practitioner.

Dr. W. A. Coventry, Chairman of the Committee on Low Income and Indigent Problems, brings to any committee a long experience, great ability and forceful effort. Of all our economic problems, probably this committee on Low Income and Indigent Problems is dealing with the most important. It is upon the groups of low income and on the indigent that recent demands for social change have been directed.

Under the chairmanship of Dr. F. J. Savage, the Committee on Interprofessional Relations have been active, also. It has sought the coöperation, particularly, of the dental and legal professions, and it has worked very closely with Dr. Branton's Committee. The contribution of these committees to our program has been beyond estimation. In other issues we shall have an opportunity to mention others which have also done excellent service.

GEORGE EARL, *President*,
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

OFFICIAL JOURNAL OF THE MINNESOTA STATE MEDICAL
ASSOCIATION

Published by the Association under the direction of its Editing
and Publishing Committee

EDITING AND PUBLISHING COMMITTEE

E. M. HAMMES, Saint Paul C. B. WRIGHT, Minneapolis
WALTMAN WALTERS, Rochester T. A. PEPPARD, Minneapolis
THOMAS GAGE CLEMENT, Duluth

EDITORIAL STAFF

CARL B. DRAKE, Saint Paul, Editor
W. F. BRAASCH, Rochester, Associate Editor
GILBERT COTTAM, Minneapolis, Associate Editor

Annual Subscription—\$3.00

Single Copies—\$0.40

Foreign Subscriptions—\$3.50

The right is reserved to reject material submitted for editorial
or advertising columns. The Editing and Publishing Committee
does not hold itself responsible for views expressed either in
editorials or other articles when signed by the author.

Classified advertising—five cents a word; minimum charge,
\$1.00. Remittance should accompany order.

Display advertising rates on request.

Address all communications to Minnesota Medicine, 2642 Uni-
versity Avenue, Saint Paul, or Suite 308, National Bldg., Min-
neapolis. Telephone: Nestor 2641.

BUSINESS MANAGER

J. R. BRUCE

Volume 22

JUNE, 1939

Number 6

DIGITALIS UNIT CHANGED*

THE fact that the digitalis unit of the last
Pharmacopeia of the United States (XI),
which became official June 1, 1936, was increased
over that of the U. S. P. X has received little
attention and is not generally known. The new
unit (U. S. P. XI) is the international or Mag-
nus cat unit and is contained in 0.1 gram of
the U. S. P. XI digitalis powder or 1 c.c. of the
U. S. P. XI tincture of digitalis. This corre-
sponds to 0.17 gram of the U. S. P. X digitalis
powder or 1.7 c.c. of the U. S. P. X tincture.

*For more detailed explanation of the subject, the reader
is referred to Correspondence, Journal A.M.A., 112:1180,
(March 25) 1939.

In other words, when a physician prescribes 1
c.c. of the new tincture, he is prescribing a dose
corresponding to 1.7 c.c. of the older tincture.

The importance of this fact lies not so much
in the gradual digitalization of a cardiac patient
as in determining the maintenance dose or in
determining the amount of the dose required
for full digitalization. Whereas 1.5 grains of
the U. S. P. X powdered leaf, or 15 minims of
the U. S. P. X tincture per ten pounds of body
weight, were required for nearly complete digi-
talization, this would be approximately 70 per
cent too strong a dose in the preparations made
official by the U. S. P. XI. If a patient elimi-
nated 15 minims of the older tincture daily, he
would more likely eliminate nearer 10 minims of
the new tincture.

It is said that many pharmaceutical houses
are still conforming to the U. S. P. X standard
in the manufacture of their digitalis prepara-
tions. It becomes important at times to know,
therefore, whether a preparation conforms to
the tenth or eleventh edition of the pharma-
copeia.

GOLDBLATT'S HUMORAL HYPOTHESIS

THE experiments which have been reported
in the *Journal of Experimental Medicine* by
Goldblatt during the past few years on the pro-
duction of hypertension in dogs are of interest.
By means of an ingenious clamp, he constricts
the main artery of one or both kidneys, produc-
ing an ischemia of the organ. He has found
that so treating one kidney usually results in an
elevation of blood pressure which in a few weeks
tends to recede and even return to normal. If
such a treated kidney is removed while the blood
pressure is elevated, the pressure returns prompt-
ly to normal. If, however, after the artery to one
kidney is clamped, the normal kidney is removed,
the elevated blood pressure persists.

If moderate clamping of the arteries to both
kidneys is performed, an elevated blood pres-
sure is produced which persists for months and
even several years. While the urea clearance
of such kidneys is reduced, the function of these

MINNESOTA MEDICINE

kidneys is not otherwise impaired. Extreme clamping of the arteries produces symptoms of uremia. Most interesting is the observation that severing the nerve supply to the kidneys neither prevents nor relieves the hypertension.

Microscopically the kidneys which have had their blood supply moderately reduced show thickening of Bowman's capsule and of the basement membrane of some of the glomeruli. The picture produced resembles that of essential hypertension, although the reduction in the blood supply is produced by narrowing the renal arteries, whereas in essential hypertension the narrowing takes place in the renal arteries.

Applying the clamp to other arteries such as the splenic or femoral, however, does not produce hypertension.

The author concludes from his experiments that ischemia of the kidneys is the common factor in experimental and essential hypertension and, inasmuch as experimental hypertension is independent of nerve supply, offers the hypothesis that ischemia of the kidneys produces some humoral substance in the kidneys which acts in some way, possibly directly on the muscles of the arterioles in general, to produce hypertension.

Goldblatt's idea, as we interpret it, is that generalized arteriosclerosis causes ischemia of the kidneys which liberates some sort of humoral substance which causes through its action on the arterioles a further narrowing of the peripheral arterial bed, and hypertension follows. The generally accepted conception of a narrowed peripheral arterial bed being the cause of hypertension, is apparently maintained. It does seem as though an arteriosclerosis sufficient to cause renal ischemia should be sufficient in itself to cause hypertension, without invoking a humoral hypothesis. The cause of arteriosclerosis still remains to be determined.

THE STUDENTS' HEALTH SERVICE AT THE UNIVERSITY OF MINNESOTA

THE Students' Health Service of the University of Minnesota was established in 1918 because the University administration felt that it had a responsibility for the health of the students on the University campus. The policies and activities of the Health Service since its inception have been designed to attempt to pre-

vent illness among University students and thus prevent the economic loss resulting from time lost from school.

The activities of the Health Service include complete physical examinations and health conferences for all students who enter the University; the control of communicable diseases; health examinations for all students who wish them, and as a requirement for students in the Colleges of Medicine, Dentistry and Nursing; clinical service for medical advice or care throughout the day and emergency service at night; hospital care for students in need of hospitalization; and dentistry, x-rays and laboratory service.

The health examinations required on entrance to the University, as well as the periodic examinations, are used not only to detect students who may have some communicable disease which might make them a danger to the University community but also as a basis for discussing with the student his health habits of living while at the University. Routine tuberculin tests and chest x-rays of positive reactors are a part of all complete physical examinations. Each year new cases of active tuberculosis are discovered as a result of this case-finding program. The Wassermann test is done routinely, also, as a part of the examination. Although the incidence of syphilis in the University population is very low, we believe the educational value of the Wassermann test makes it worth while. Many minor defects, such as malnutrition, dental caries, impairments of hearing and vision, et cetera, are found. Students are advised about having such defects corrected.

Medical service is available to students through the out-patient dispensary of the Students' Health Service. Students are encouraged to report to the dispensary with minor illnesses. Because of this fact not infrequently contagious diseases are discovered in the prodromal period, and thus the prevention of exposure to other students is attained. Approximately 90 per cent of the conditions for which students consult physicians in the Health Service dispensary are of such a minor nature that, were it not for the availability of the Health Service, no medical care whatever would be sought.

Any University student may be admitted to the Health Service infirmary, although the policy is to advise students who have family physicians

to go home and place themselves under their care. The primary reason for providing an infirmary on the University campus is to care for students living in dormitories or rooming houses. These students who are living away from home make use of the Health Service infirmary and are hospitalized even for minor illnesses.

Ever since the Health Service was first started it has attempted to coöperate in every way possible with physicians engaged in the private practice of medicine. Occasionally we hear a report that the Health Service frequently performs surgical operations upon students who can afford to pay the fees of private surgeons. The facts are that only students who are self-supporting are given surgical care at the Health Service. As over 60 per cent of all students in the University are either wholly or partially self-supporting, a number of operations are done at the Health Service each year. Since no surgical fees are charged for these operations, the Health Service has nothing to gain by the performance of the operation, and obviously no member of the staff wishes to assume responsibility which he can pass on to someone else. The policy, therefore, has been to coöperate and not compete with the practicing physicians and surgeons in the state.

It is our hope that most of these students when they leave the University will have a much better understanding of modern medicine than they ever had before and will have learned to seek medical service promptly when ill, as well as seek the advice of the family physician for preventive medical work.

RUTH E. BOYNTON, M.D.,
Director.

EDITING AND PUBLISHING COMMITTEE

THE resignation of Dr. James T. Christison from the Editing and Publishing Committee terminates twenty years of continuous and active service on the committee. Appointed in 1919, Dr. Christison has taken a deep interest in the journal's welfare and growth.

Dr. Christison has always taken an active part in medical organizations, for besides serving on numerous committees, he was president of the Ramsey County Medical Society in 1917, president of the Minnesota State Medical Association in 1929, and a state representative in the

House of Delegates of the American Medical Association at the time of his retirement from active practice. It is the wish of the journal that Christy will be able to devote many years to his outside interests after many years of medical practice.

At its meeting in February, the Council appointed Dr. Thomas Gage Clement of Duluth to take Dr. Christison's place on the Editing and Publishing Committee. His appointment is the first to be made outside the Twin Cities and Rochester.

AMENDMENTS OF THE MINNESOTA BIRTH REGISTRATION LAW

THE following announcement has been received from the office of the Minnesota Department of Health, of which A. J. Chesley, M.D., is secretary and executive officer:

Amendments of the Minnesota birth registration law enacted into law during the 1939 session of the Legislature, of interest to physicians, particularly to those practicing obstetrics and to those holding the official position of local registrar in cities, shorten the attending physician's time of reporting births to local registrars to five days, change the local registrar's time of reporting to the State Registrar to the fifth of the month, provide that physicians shall report births of illegitimate children direct to the State Registrar, and that the State Registrar may make and file replacement or substitute birth certificates under certain conditions.

Amendments Affecting Physicians

Physicians must report births to the local registrar within *five*, instead of within ten days.

Physicians must file birth certificates of illegitimate children direct with the State Registrar, not with the local registrar. The State Registrar must in turn send an abstract containing the surname of such child, the sex, and the date of birth to the local registrar, with instructions concerning its disposition, and instructions to direct anyone making inquiry about the birth record to the State Registrar.

When the attending physician is unable to certify the cause of death on the death certificate because of incomplete findings, he may substitute for the cause the statement: "*Cause not yet determined.*"

Substitution of New Records

The State Registrar may make a substitute birth record whenever he receives proof satisfactory to him that:

(a) The parents of an illegitimate child have married each other.

(b) A court of competent jurisdiction has entered

EDITORIAL

a judgment, order or decree relative to the parentage or adoption of a person.

When a substitute certificate is made, the original certificate and all documents pertaining to it must be withdrawn from the active file of birth records and placed in a sealed envelope in a confidential file. The envelope may be opened only upon written order of the State Registrar or of the court, and the original certificate may be copied only upon order of a court of record.

MINNESOTA LEGISLATURE PROVIDES FOR STUDY OF OCCUPATIONAL DISEASE UNDER WORKMEN'S COMPENSATION LAW

In the hope of determining what diseases are the result of occupational endeavor the 1939 Minnesota Legislature enacted a law providing for the reporting by physicians of cases believed by the medical profession to be the "result of the nature of the employment" of the particular individual. Ordinarily a workman is entitled to compensation and medical care at the expense of the employer only in the case of an accident arising out of and in the course of his employment. However, under the law as it has been for a number of years, certain diseases classified under the statute as the so-called "occupational diseases" are compensable in the same manner as accidents. The difficulty with the law, as it exists today, is that one worker with a disease listed under the law is compensated while another in perhaps the same industry with a different ailment is not compensated.

Many members of the medical profession have had the sad experience of devoting a great amount of time and effort to the treatment of an ailing workman, only to be informed that the ailment is not listed under the law as compensable, and therefore the physician cannot look to the employer for remuneration for his services. The law just enacted is quite simple in its terms, and is published in full below. When first introduced in the Legislature the bill had a penalty clause for failure of the physician to comply with its terms. It also provided that the report must be made within forty-eight hours. Both of these sections were stricken at the request of the Minnesota State Medical Association and the operation of the law placed on a purely voluntary coöperative basis. The importance of this study to the injured or ailing workman and to the medical profession cannot be over-emphasized. A prompt and enthusiastic coöperation on the part of the medical profession will enable all of us to assist in determining what amendments should be made to the present law on occupational disease. So that the physicians may have a better grasp of the problem there is also being published herewith the present Minnesota law on occupational diseases that are compensable.

Remember! the purpose of the 1939 law is to determine what diseases are of occupational origin in a given case. Read the law over carefully and then follow it. KEEP A COPY OF EVERY REPORT

SENT TO THE STATE DEPARTMENT OF HEALTH. The Minnesota State Medical Association wants your suggestions and advice in this matter.

Committee on Public Policy,
Minnesota State Medical Association,
L. L. SOGGE, *Chairman*.

* * *

CHAPTER 322—H. F. No. 651 A BILL

FOR AN ACT to provide for the investigation and control of poisoning and disease contracted as a result of the nature of employment, and for the reporting of such cases of poisoning and disease.

Be it enacted by the Legislature of the State of Minnesota:

Section 1. Any physician having under his professional care any person whom he believes to be suffering from poisoning and disease contracted as a result of the nature of employment, and for the reporting of such cases of poisoning and disease. contracted as a result of the nature of the employment of such person, shall, within five days, mail to the state department of health a report, stating the name, address and occupation of such patient, the name, address and business of his employer, the nature of the disease and such other information as may reasonably be required by said department. The department shall prepare and furnish the physicians of this state suitable blanks for the reports herein required. No report made pursuant to the provisions of this section shall be admissible as evidence of the facts therein stated in any action at law or in any action under the workmen's compensation act against any employer of such diseased person. The state department of health is authorized to investigate and to make recommendations for the elimination or prevention of occupational diseases which have been reported to it or which shall be reported to it in accordance with the provisions of this section. Said department is also authorized to study and provide advice in regard to conditions that may be suspected of causing occupational diseases, provided information obtained upon investigations made in accordance with the provisions of this section shall not be admissible as evidence in any action at law to recover damages for personal injury or in any action under the workmen's compensation act; provided further, that nothing herein contained shall be construed to interfere with or limit the powers of the department of labor and industry to make inspections of places of employment or issue orders for the protection of the health of the persons therein employed. Whenever upon investigation by the state board of health said board reaches a conclusion that a condition exists which is dangerous to the life and health of the workers in any industry or factory or other industrial institutions, it shall file a report thereon with the state department of labor and industry.

Approved April 20, 1939.

* * *

PRESENT MINNESOTA OCCUPATIONAL DISEASE LAW

OCCUPATIONAL DISEASES—HOW REGARD-ED—COMPENSATION FOR—DEFINITIONS OF—(1) The disablement of an employe resulting from an occupational disease described in sub-section (9) of this section, except where specifically otherwise provided, shall be treated as the happening of an accident within the meaning of Part 2 of this act and the procedure and practice provided in such Part 2 shall apply to all proceedings under this section, except where specifically otherwise provided herein. When-

ever used in this section, "disability" means the state of being disabled from earning full wages at the work at which the employee was last employed, and "disability" means the act of becoming so disabled.

(2) If an employee is disabled or dies and his disability or death is caused by one of the diseases mentioned in sub-section (9) of this section, and the disease is due to the nature of the corresponding employment as described in such sub-section in which such employee was engaged and was contracted therein, he or his dependents shall be entitled to compensation for his death or for the duration of his disability according to the provisions of Part 2 of this act, except as otherwise provided in this section; provided, however, that if it shall be determined that such employee is able to earn wages at another occupation which shall be neither unhealthful nor injurious, and such wages do not equal his full wages prior to the date of his disablement, the compensation payable shall be a percentage of full compensation proportionate to the reduction in his earning capacity.

(3) Neither the employee nor his dependents shall be entitled to compensation for disability or death resulting from disease unless the disease is due to the nature of his employment and contracted therein within the twelve months previous to the date of disablement, whether under one or more employers.

(4) If an employee at the time of his employment, wilfully and falsely represents in writing that he has not previously suffered from the disease which is the cause of his disability or death, no compensation shall be payable.

(5) The total compensation due shall be recoverable from the employer who last employed the employee in the employment to the nature of which the disease was due and in which it was contracted. If, however, such disease was contracted while such employee was in the employment of a prior employer, the employer who is made liable for the total compensation as provided by this sub-section, may appeal to the commission for an apportionment of such compensation among the several employers who since the contraction of such disease shall have employed such employee in the employment to the nature of which the disease was due. Such apportionment shall be proportioned to the time such employee was employed in the service of such employers, and shall be determined only after a hearing, notice of the time and place of which shall have been given to every employer alleged to be liable for any portion of such compensation. If the commission find that any portion of such compensation is payable by an employer prior to the employer who is made liable to the total compensation as provided by this sub-section, it shall make an award accordingly in favor of the last employer, and such award may be enforced in the same manner as an award for compensation.

(6) The employer to whom notice of death or disability is to be given, or against whom claim is to be made by the employer shall be the employer who last employed the employee during the said twelve months in the employment to the nature of which the disease was due and in which it was contracted, and such notice and claim shall be deemed seasonable as against prior employers.

(7) The employee or his dependents, if so requested, shall furnish the last employer or the commission with such information as to the names and addresses of all his other employers during the said twelve months, as he or they may possess; and if such information is not furnished, or is not sufficient to enable such last employer to take proceedings against a prior employer under sub-section (5) of this section, unless it be established that the disease actually was contracted while the employee was in his employment, such last employer shall not be liable to pay compensation, or, if such information is not furnished or if not sufficient

to enable such last employer to take proceedings against other employers under sub-section (5) such last employer shall be liable only for such part of the total compensation as under the particular circumstances the commission may deem just; but a false statement in the information furnished as aforesaid shall not impair the employee's rights unless the last employer is prejudiced thereby.

(8) If the employee, at or immediately before the date of disablement, was employed in any process mentioned in the second column of the schedule of diseases in sub-section (9) of this section, and his disease is the disease in the first column of such schedule set opposite the description of the process, the disease presumptively shall be deemed to have been due to the nature of that employment.

(9) For the purposes of this act only the diseases enumerated in column one, following, shall be deemed to be occupational diseases:

Column 1.	Column 2.
Description of Diseases.	Description of Process.
1. Anthrax.	1. Handling of wool, hair, bristles, hides or skins.
2. Lead poisoning or its sequelæ.	2. Any process involving the use of lead or its preparations or compounds.
3. Mercury poisoning or its sequelæ.	3. Any process involving the use of mercury or its preparations or compounds.
4. Phosphorus poisoning or its sequelæ.	4. Any process involving the use of phosphorus or its preparations or compounds.
5. Arsenic poisoning or its sequelæ.	5. Any process involving the use of arsenic or its preparations or compounds.
6. Poisoning by wood alcohol.	6. Any process involving the use of wood alcohol or any preparation containing wood alcohol.
7. Poisoning by nitro and amido-derivatives of benzene (dinitro-benzol, anilin and others), or its sequelæ.	7. Any process involving the use of a nitro or amido-derivative of benzene or its preparations or compounds.
8. Poisoning by carbon bisulphide or its sequelæ.	8. Any process involving the use of carbon bisulphide or its preparations or compounds.
9. Poisoning by nitrous fumes or its sequelæ.	9. Any process in which nitrous fumes are evolved.
10. Poisoning by nickel carbonyl or its sequelæ.	10. Any process in which nickel carbonyl gas is evolved.
11. Dope poisoning (poisoning by tetrachlor-methane or any substance used as or in conjunction with a solvent for acetate of cellulose or its sequelæ).	11. Any process involving the use of any substance used as or in conjunction with a solvent for acetate of cellulose.
12. Poisoning by gonioma kamassi (African boxwood) or its sequelæ.	12. Any process in the manufacture of articles from gonioma kamassi (African boxwood).
13. Chrome ulceration or its sequelæ.	13. Any process involving the use of chromic acid or bichromate of ammonium potassium, or sodium, or their preparations.
14. Epitheliomatous cancer or ulceration of the skin or of the corneal surface of the eye, due to tar, pitch, bitumen, mineral oil or paraffin, or any compound, product or residue of any of these substances.	14. Handling or use of tar, pitch, bitumen, mineral oil, or paraffin or any compound, product or residue of any of these substances.
15. Glanders.	15. Care or handling of any equine animal or the carcass of any such animal.
16. Compressed air illness or its sequelæ.	16. Any process carried on in compressed air.
17. Ankylostomiasis.	17. Mining.
18. Miner's nystagmus.	18. Mining.
19. Subcutaneous cellulitis of the hand (beat hand).	19. Mining.
20. Subcutaneous cellulitis over the patella (miner's beat knee).	20. Mining.
21. Acute bursitis over the elbow (miner's beat elbow).	21. Mining.

22. Inflammation of the synovial lining of the wrist joint and tendon sheaths.
23. Cataract in glassworkers.
24. The following occupational diseases due to the hazards of fire fighting, myocarditis, coronary sclerosis, and pneumonia or its sequelae in firemen.
22. Mining.
23. Processes in the manufacture of glass involving exposure to the glare of molten glass.
24. Active duty with organized fire department.

(10) Nothing in this section shall affect the rights of an employee to recover compensation in respect to a disease to which this section does not apply if the disease is an accidental personal injury within the meaning of the other provisions of Part 2 of this act.

(11) The provisions of this section shall not apply to disability or death resulting from a disease contracted prior to the date on which this act takes effect.

Section 4327 Mason's Minnesota Statutes for 1927, as amended by Chapter 306, Laws of 1939.

A New Dietary Factor

About three years ago, Day, Langston and others of the University of Arkansas, placed monkeys on a presumably adequate diet containing all known vitamins. This diet consisted of a mixture of casein, polished rice, ground whole wheat, cod liver oil, ascorbic acid, salt mixture and sodium chloride. All monkeys fed this diet developed anemia, leukopenia, gingivitis, diarrhea, anorexia and loss of weight. Death invariably occurred in from one to three months. These investigators then tested the effects of the addition of nicotinic acid to their routine deficiency diet. The nicotinic acid had no demonstrable effect on the pellagra-like oral lesions in these animals. In later tests the Arkansas physiologists found that 1 mg. of riboflavin added to the daily diet will not prevent the development of pellagra in monkeys, nor will a combination of nicotinic acid, riboflavin and thiamin appreciably affect the course of this deficiency disease. If the daily deficiency diet is supplemented by 10 Gm. of dried brewers' yeast, however, or by 2 Gm. of liver extract, normal body growth and a normal blood picture are maintained over long periods. They conclude from these results that monkeys require some factor contained in yeast or in liver extract in addition to the factors commonly recognized as a part of the vitamin B complex. For this unknown nutritional factor they tentatively suggest the name "vitamin M." Attempts to isolate and identify the new antipellagra "vitamin" are now in progress in their laboratory. (J.A.M.A., April 1, 1939, p. 1258.)

Sulfanilimide and Tubercle Bacilli

The "wonder drug"—sulfanilimide—is being modified in the attempt to make it effective against the acid-fast tubercle and leprosy bacilli, but the work does not, as yet, permit any conclusion as to the efficacy of the new product in man. It is a combination of sulfanilimide and of coconut oil which it is hoped will enable the drug to penetrate the waxy content of the bacilli, which has heretofore served as armor against chemotherapy.—Crossley, M. L., with Northey, E. H., and Hultquist, M. E., *N. Y. Times*, April 7, 1939.

JUNE, 1939

OF GENERAL INTEREST

Dr. C. H. Sherman, formerly of Oakes, North Dakota, is now associated with Dr. E. V. Strand, at Bayport, Minn.

* * *

Dr. George D. Kaiser, recently of Cokato, Minn., will attend the practice of Dr. S. W. Giere at Benson during the latter's absence in Hawaii on a two month's vacation. Dr. Giere left on May 20.

* * *

Dr. Joseph L. Garten, who recently completed a three-year fellowship in ophthalmology and otolaryngology at the Minneapolis General Hospital, announces his association with Doctors Malcolm C. Pfunder and E. J. Borgeson, of Minneapolis.

* * *

Dr. John L. McKelvey, Professor of Obstetrics, University of Minnesota, and Dr. Russell Moe of Duluth, recently successfully passed examinations of the American Board of Obstetrics and Gynecology, granting them the title of Diplomate.

* * *

The members of the Washington County Medical Society entertained their wives and guests at dinner at the Stillwater Club Rooms, May 9, 1939. This entertainment took the place of the scientific program, as this was the last meeting of the society until September.

* * *

Dr. Gerald T. Evans, assistant professor of physiological chemistry, Yale University, has been appointed associate professor of medicine and director of chemical and metabolic laboratories at the University Hospitals. Dr. Evans is a McGill graduate, class of 1932, and received the degree of Ph.D. from the University of Pennsylvania in 1937.

* * *

Dr. William Davis, well known general practitioner of Saint Paul, retired from active practice May 1, 1939. Graduating from Harvard Medical School in 1880, he spent a year in postgraduate work in Vienna and two years in practice at Syracuse, New York, before moving to Saint Paul in 1883. One of the founders of the Minnesota Academy of Medicine, he served as its president in 1903, was president of the Ramsey County Medical Society in 1892, and the Minnesota State Medical Association in 1901.

Such a record of fifty-five years of practice in one locality is hard to equal. During this time Dr. Davis has endeared himself to a large clientele and a wide circle of professional friends. He will now have time to devote to his large family, which includes several great grandchildren.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the

Minnesota State Medical Association

W. F. Braasch, M.D., Chairman

NO EMERGENCY IN MINNESOTA

The 86th Annual Meeting is in progress at the Minneapolis Auditorium as this issue goes to press.

Many important matters are scheduled to come before the House of Delegates at this meeting and many others not already scheduled will undoubtedly be presented for consideration of delegates and officers.

It is remarkable in these times, however, and in contrast to the feverish experimentation in progress in a number of other state medical bodies, that no grave local emergencies confront the physicians of Minnesota.

A major legislative session ended without disturbing in any way Minnesota's enviable legislation for protection against unqualified practitioners and without disturbing, in any new enactments, the established plan for care of relief clients in rural counties. In point of fact, the legislative provision for free choice of physician was made more specific by addition of the phrase "for services and supplies" to the clause in the law providing free choice of vendor to the relief client.

It seems quite certain that Minnesota will not be a proving ground for experiments in new forms of medical service. On the other hand, it will undoubtedly continue to be pointed to as a national example for steady and continuous progress, with a close coöperation between practicing physicians and official agencies in the administration of service to the needy, and a net result of steadily diminishing morbidity and mortality rates. In many instances these rates set records for the entire United States.

Highlights of deliberations of both Council and House of Delegates will appear next month in these columns.

RESULTS OF THE SURVEY OF THE NEED AND SUPPLY OF MEDICAL CARE IN MINNESOTA

Attempts to make a survey of the need and supply of medical care in Minnesota met with a number of difficulties. It soon became evident that it was going to be difficult to arouse active interest in the survey and to get the members of the Association to understand its objectives and its importance to the practice of medicine. However, by means of repeated bulletins, letters and meetings, and particularly through the personal efforts of Mr. Rosell, many of the county societies responded to the call and turned in creditable reports.

Form No. 1 for physicians was distributed to 1,984 physicians and 739, or 37.2 per cent, were filled out and returned. The majority, or approximately 65 per cent, of the doctors reporting, had comments to make on the handling of indigent problems in this state. They appeared, furthermore, to express an unbiased opinion on these problems, free expression being due perhaps to the fact that they did not have to convey their identity. The greatest response came from the large cities, although several rural medical societies, such as Red River Valley, Blue Earth County, Blue Earth Valley, Wabasha, Watonwan and Washington Counties, responded wholeheartedly both in point of forms returned and in content.

While the number of physicians who filled out the different forms was somewhat disappointing, nevertheless the number compared favorably with that in most of the other states. In addition to the information obtained from the forms filled out by physicians, many data of value are available from the forms which were filled out by allied health agencies. These forms all required much time and effort for completion and much credit should be given to those

coöperating in the survey. The data derived from these accumulated forms have given us information concerning the medical care in our state which has never been assembled before and which should be of great value in aiding us to correct any deficiencies revealed and guide our future plans.

While the following summary of the various data assembled and comments submitted by the profession is far from complete, it contains much that is of interest.

Estimates on Free Care

The actual number of persons who received free care as reported on the doctor's return reached a total of 75,468. This total included all who received care in the office, home or hospital in the state. It is not exact, however, being in many cases only an estimate. Often the figure given was thought to be low, but, having no record, the physician was inclined to be conservative in his estimate.

The number of hours devoted by physicians in 1937 to the care of free ambulatory patients in outpatient departments, dispensaries and clinics showed a total of 23,896 hours. This figure included work devoted to the examination of CCC enrollees, school children in Summer Health Roundups and visiting clinics. Undoubtedly, this figure would have been greatly increased had the response been greater over the whole state.

For Private Practice

The general consensus of the doctors responding on the subject of state medicine or socialized medicine was that private practice of medicine without interference or dictation from the state should continue. One doctor in the Upper Mississippi Medical Society states the case—"The doctor-patient relationship is of high importance from the doctor's angle and more so from the patient's. Any attempt to dictate who shall 'doctor' who would destroy one of the finest personal relationships the world has ever known and one of the greatest healing values in the sick room. May this wonderful and valuable relationship never be destroyed. The indigent sick should be cared for by the doctors in the locality in which such particular indigent resides and the doctor should be paid from public funds direct at some reduced fee comparable to the

services rendered. If possible the patient should be required to contribute some portion of the fees for services. This tends to prevent a total loss of pride from total charity and helps maintain an appreciation of the value of the services rendered."

Compromise Suggested

One doctor in the same district assumed a rather different attitude. He says, "I believe that some sort of restricted state medicine might offer more security to the less able and middle class of practitioner than the present state of affairs. The outstanding men of the medical profession, of course, always are able to ask and receive adequate compensation, and I believe always will be able to do so; but every doctor cannot be outstanding and we need the honest, fairly able men as much as the brilliant ones. Some final provision for these men seems to me to be a pressing need. I think the plan should come from the medical men and not the laymen. I am not enough of an economist to formulate such a plan, but I believe it will come from some source and that source should be the medical body."

"High Cost Is Problem"

Another doctor in Ramsey County Society says, "The cost of serious illness entailing expenses for hospitals, nurses, laboratory examinations and doctors is the most important problem to be solved. Insurance in some form is the logical solution to this unequal distribution. Coverage for this hazard cannot be complete any more than coverage for fire insurance can be complete as the moral hazard would be too great; also the overhead cost would be too great and the undertaking would become involved in politics. The present hospital plan meets this problem in a somewhat limited way by serving selected groups of the unemployed and their families. The suggested sickness insurance need not be impractical with the insured restricted to a certain income group, and a certain percentage of the medical bills paid directly according to a fee schedule approved by the local medical society. This would eliminate a lot of free care and would decrease the percentage of uncollectable bills. What is more important, it would be of great benefit to a group of patients who need financial assistance."

Education Needed

One-fourth of the doctors reporting in St. Louis County definitely stated that political influence is beginning to seep in and undermine the private practice of medicine. One elderly physician states, "Education of the public about medical care without reference to politics is needed. I certainly hate to think of the day when patients will be treated by 'political foot-balls' and not by private physicians. Am getting old, my years of practice are limited, but am thinking of the future patient and not the doctor and politician."

"Sick Well Cared For"

Most of the men reporting in all societies regard the set-up in their localities for the care of indigents as satisfactory. Many report that all doctors are doing everything in their power for borderline and indigent cases. One physician, an elderly man in the Park Region Society, says, "The sick are well taken care of in this community. This refers to the poor class. I do charity work every day and the sick are not neglected by any of the doctors. I think they are getting treatment the last few years better than any time I have been practicing medicine and that is forty years service." Another doctor in Camp Release Society says, "All the needy that I know have received better care than the average medium salaried family through the charitable medical and dental dispensaries from which the smaller salaried family can obtain no help. Discourage any plan for permanent relief set-up insofar as medical care is concerned. Stop making more charity patients, re-establish self-respect among the populace if any is left to re-establish."

University Hospital Crowded

In quite a few instances the doctors remarked that the service afforded by the University Hospital was inadequate due to the over-crowded conditions and the demand for beds. Two comments in the Clay-Becker Society referred to the use of the University Hospital for indigent patients—that the waiting list was too long and that they believed money spent on patients sent to the University Hospital could better be used to pay for their care in the local hospitals.

Welfare Work Criticized

Many of the doctors expressed annoyance with the quality of social service work as it is related to care of the needy sick. One doctor in St. Louis County offers the following comment in this connection: "I have found that wherever patients have gone without medical care or where such medical or hospital care has been hard to obtain it has been due to incompetent and indifferent, lazy welfare workers without medical training; these people have only one thought in mind and that is any easy job with a good pay check. They refuse to work after hours to investigate or help in most urgent cases of sickness. They have been trained in large cities and are not fit for work in rural counties."

One doctor in Mower County says, "Too much time is lost on investigations and not enough attention is paid to the thoroughly ill who could be in earning condition after surgical attention." He believes that the doctors themselves are partially to blame because of professional jealousies, for failure to allow those doctors who are willing to do so, to conduct free services."

Hospital Response Limited

Hospital Form No. 2 was sent out to 183 hospitals. From these, 68 forms were returned, representing a response of 37.16 per cent.

The greater hospitalization problem of indigents appears from the facts presented to be located in the large city hospitals rather than in the country hospitals. This undoubtedly is due somewhat to the fact that so many of the free patients are referred to the University Hospital for hospital care.

According to the figures submitted, a total of 126,206 persons received care in 1937. Of this total, 90,820 persons, or 71.2 per cent, were admitted as pay or part pay patients; 26,550, or 21.3 per cent, were admitted as public charges and 8,836, or 7.5 per cent, were admitted as free patients. There was a total of 1,474,940 patient days of hospital care reported in the survey, of which 670,947 days were devoted to pay and part pay care, 710,058 days were devoted to public charges and 193,935 days were devoted to free patients.

Rates Vary

The survey reports show a total of 7,185 beds available in the hospitals in Minnesota in 1937.

MEDICAL ECONOMICS

This figure is very inaccurate, however, since only 37.7 per cent of the hospitals reported. The actual figure as published in the Hospital number of the American Medical Association Journal showed a total of 21,983 beds available. The daily rates for hospital care showed a variance from a low of \$1.35 for ward beds to a high of \$3.50 for ward beds; a low of \$1.35 for semi-private rooms to a high of \$4.25 for semi-private; and a low of \$3.50 for private rooms to a high of \$10.00 for private rooms.

The general current of opinion as indicated in the survey showed that all facilities are operating with relative satisfaction to meet the problem of care for low income and indigent cases.

In the main, physicians, hospitals, welfare agencies, are doing the job well, though additional funds could be used, especially in health work among school children, and particularly in the care of children's teeth. There is no evidence, certainly, of any crisis demanding emergency measures.

W. F. B.

MEDICAL ECONOMICS FOR SENIOR MEDICAL STUDENTS

A comprehensive course of lectures on the economic, legal and social relations of the physician was initiated by Dean H. E. Diehl for senior medical students at the University of Minnesota during the spring quarter this year. For the first time lectures on these subjects were compulsory. They were given weekly as a part of the regular course.

The desirability of such a series has been urged by officers and committees of the Minnesota State Medical Association over a period of years. It has been a major part of the program of the Committee on Medical Economics and the Committee on University Relations, as well. Dean Diehl has the warm approval of all members of the association, therefore, in taking this step ahead in practical education. It is a step which will mean much to the young men who graduate in Medicine in Minnesota. It will also mean much to medical organization and to the maintenance of the ethics of the profession and to traditional standards of practice.

Titles and lecturers indicate clearly the excellence of the first course. They are as follows:

Medical Licensure.....	A. W. Adson
Ethics of the Practice of Medicine.....	S. Marx White
Management of Public and Private Patients.....	S. Marx White
Quackery, Fads, Cults and Patent Medicines.....	W. A. O'Brien
Malpractice.....	Mr. Ray Scallon
Starting the Practice of Medicine—Location, Relations with Other Physicians, and Hospitals, Fees, etc.....	O. J. Hagen
The Physician in Court.....	Judge Paul Carroll
Medical Care of Indigents and Low Income Groups	R. E. Scammon
Health Insurance, Hospital Insurance, Attitude Toward Them of Organized Medicine.....	R. E. Scammon
Medical Organization, National, State, Local.....	C. B. Wright

"TREATING THE GERM"

(Monthly Editorial Prepared by the Medical
Advisory Committee)

Over three years of study of the malpractice situation in the state has convinced your Medical Advisory Committee that malpractice problems constitute a disease which eats at the fundamentals of good medical practice much as any other germ disease causes a disturbance in the human economy and that it can only be treated by careful adherence to the tenets of good medical practice and forbearance toward one another.

There are four ways to treat this or any other disease:

First, we can stop this germ invasion by preventive means. Careful work and meticulous, detailed study of the cases as they present themselves with close follow-ups after treatment are preventive measures easily carried out.

Second, we can use the power of self control and professional ethics to confer immunity much as we do with vaccination and other prophylactic measures.

Third, we can develop a spontaneous, natural resistance to malpractice litigation within our Society by believing that all men who are practicing our profession have a right to their own opinions whether they agree with ours or not—a resistance which the public quickly senses and appreciates.

Fourth, we can use a method of direct attack on those who unknowingly, unwittingly or through the thought of personal gain or aggrandizement hope to enrich themselves at our expense, whether in our profession or any other.

We excise the disease-laden area if necessary

to cure a disease of the body. Let us remove and eradicate from the body politic those in our midst who selfishly harbor the germs of discontent, prejudice, deceit, and intolerance to the rights of others.

B. J. B.

"... WE WILL DESTROY THE LAW ITSELF"

In view of the indictment of the American Medical Association for violation of the Sherman Anti-Trust Law the following quotation from a recent address by Thurman R. Arnold, Assistant Attorney General of the United States holds a peculiar interest for physicians.

"Anti-trust enforcement is not a moral problem. It is an economic problem requiring that rigid prohibition be tempered by a rule of reason. This requires exercise of judgment by the prosecutor and the court. If we insist on rigid standards and definitions, we will destroy the law itself.

Combinations which actually contribute to the efficiency of mass production should not be destroyed. Concerted action by groups of competitors to insure orderly marketing conditions should not be considered unreasonable. Where competition has been destroyed, mere imposition of penalties does not re-create it.

The Sherman Act is America's contribution to economic legislation. It can never be reduced to a rule-of-thumb. It can be clarified only by application to particular industries. It requires a referee with power to exercise judgment.

Wise business leadership should be willing to accept an independent judiciary as such a referee to preserve competition rather than to drift into combinations which in the long run can only end in positive government control of a regimented industrial economy."

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

Forged Medical Prescriptions Bring Five Year Prison Sentence and \$1,100.00 in Fines

Re: State of Minnesota vs. Harry C. Nagler.

Following a joint investigation made by J. Norman Peterson, Liquor Control Commissioner of Minnesota, and the Minnesota State Board of Medical Examiners, Harry C. Nagler, 55 years of age, former Minneapolis pharmacist, was sentenced on April 27, 1939, by Judge E. A. Montgomery in the District Court of Hennepin County, to a prison term of not to exceed five years.

Nagler had entered a plea of guilty on March 27, 1939, to an information charging him with the crime of forgery in the second degree. The complaint against Nagler was signed by Mr. Brist on behalf of the Medical Board and charged him with forging a medical prescription to which Nagler had signed the name of "J. A. Ready, M.D."

The investigation disclosed that Nagler was born at Winona, Minnesota, in 1883, and had resided in Minneapolis for the past 40 years. He had been employed in a number of Minneapolis drug stores as an assistant pharmacist, but allowed his registration to lapse. At the time of his arrest he resided at 113 E. 15th St., Minneapolis. The investigation also disclosed that Nagler had forged several thousand medical prescriptions calling for whiskey, alcohol and other intoxicating liquor, and had forged the names of Dr. Ready, Dr. Haywood and Dr. Matchan. Nagler stated that he was acquainted with Dr. Frank L. Ready, a former Minneapolis physician, who moved to California in 1931. In view of Dr. Ready's absence from the state, Nagler stated he felt quite safe in changing the initials and forging Dr. Ready's name. Nagler also disposed of several hundred prescriptions to which the names of Dr. Robert D. Matchan and Dr. George M. Haywood had been forged. Dr. Matchan died in 1935 and Dr. Haywood died in 1933. Nagler believed that he would be safe in using these names.

Nagler disposed of the great bulk of these prescriptions to 11 Minneapolis drug stores operated by the following individuals: Sam Beugen, Alden Drug Co., 29 No. 12th St.; Philip Shelley, Aldrich Pharmacy, 733 6th Ave. N.; Fred Bassett, Bassett Drug Co., 301 4th St. S. E.; Maurice Gordon, Community Cut Rate Drug, 1504 Nicollet Ave.; Henry A. Glendenning, Dupont Drugs, 2659 Dupont Ave. S.; Alex H. Fjelstad, Fjelstad Drug Co., 3451 Cedar Ave.; Mayer S. Furman, Furman Drug Co., 1333 Nicollet Ave.; Sherman Kassmir, Kassmir Drug, 3200 Bryant Ave.; Henry Grodnik, Lyndale Pharmacy, 3701 Lyndale Ave. S.; Berniece Murdock, Murdock Pharmacy, 2451 Bloomington Ave.; and Paul B. Dix, Rustic Lodge Pharmacy, 4300 Nicollet Ave. Nagler stated to the Court that he sold these prescriptions to the various drug stores named, for sums ranging from five to fifteen cents per prescription. The records disclose that Nagler disposed of over 2,000 forged liquor prescriptions during January, February and March, 1939. Each of the foregoing druggists were arrested on April 27, 1939, on complaints charging them with selling intoxicating liquor without a license and entered a plea of guilty on the same date before Judge Fred B. Wright of the Municipal Court in Minneapolis and each one sentenced to pay a fine of \$100.00 or to serve 60 days in the Minneapolis Workhouse. The fines totaling \$1,100.00 were paid.

Mr. Peterson announced that the liquor permits of the 11 drug stores above named, all expiring April 30, 1939, would not be renewed by his department. This will prevent the drug stores named from filling physicians' prescriptions calling for whiskey, alcohol or other alcoholic liquors.

St. Paul Man Pleads Guilty to Illegal Sale of Medicine

Re: State of Minnesota vs. William McCoy.

On April 25, 1939, William McCoy, 34 years of age, entered a plea of guilty in the Municipal Court of St. Paul to a complaint charging him with dispensing, vending and selling, at retail, drugs and medicine, without being a licensed pharmacist. McCoy was sentenced to pay a fine of \$50.00 or to serve 10 days in the St. Paul Workhouse. He paid the fine.

McCoy was arrested on February 9, 1939, following

MINNESOTA MEDICINE

a joint investigation made by the St. Paul Police Department and the Minnesota State Board of Medical Examiners. The investigation resulted from complaint that young girls and married women were purchasing medicine from the National Health Service Bureau at 1591-1593 University Ave., St. Paul, for delayed menstruation. When questioned at Police headquarters, McCoy stated that he was the owner of the National Health Service Bureau and that he had operated it for a little over a year. He also signed a statement admitting that since he had been operating the National Health Service Bureau, he had performed between 20 and 25 abortions for an average fee of \$40.00 per case. McCoy also stated that he was unmarried and lived at 594 Ashland Ave., St. Paul, and that he had resided in St. Paul all his life. McCoy is not licensed to practice any form of healing in the State of Minnesota, nor is he a registered pharmacist.

Neither the Minnesota State Board of Medical Examiners, nor its attorney, were consulted about the final disposition of this case in Court and the Medical Board does not approve of the disposition made. McCoy, at the time of his arrest, was charged with a gross misdemeanor, to-wit: in that he did "wrongfully, unlawfully and wilfully have in his possession, with intent to sell, a drug for causing unlawful abortions." Such an offense is punishable, under the laws of Minnesota, by a fine of not to exceed \$500.00, or not more than one year in jail, or both. The Medical Board feels that this is the least that the defendant should have been charged with.

Alcohol Prescriptions Result in Convictions

Re: State of Minnesota vs. James O. Cavanaugh
State of Minnesota vs. E. M. Halloran
State of Minnesota vs. Thurlow E. Sundry

Following an investigation participated in by the St. Paul Police Department, the State Liquor Control Commissioner and the State Board of Medical Examiners as to the source of several hundred medical prescriptions for alcohol, James O. Cavanaugh, Dr. E. M. Halloran and Thurlow E. Sundry were arrested on May 4, 1939. Cavanaugh was charged with practicing medicine without a license, while Dr. Halloran and Mr. Sundry were charged with the sale of intoxicating liquor without a license. Cavanaugh, whose license to practice medicine was revoked by the Minnesota State Board of Medical Examiners in February, 1935, following his entering a plea of guilty in Federal Court in St. Paul to an indictment charging him with a violation of the Harrison Narcotic Law, plead guilty in the District Court of Ramsey County on May 8, 1939, and was placed on probation until June 10, 1940. Cavanaugh, who is 69 years of age, stated to the Court that he had been writing fictitious medical prescriptions for alcohol, which he sold to Sundry for 15c apiece. The records of the Liquor Control Commissioner show that Cavanaugh wrote 90 such prescriptions from January 1 to March 7, 1939. He stated that he had been doing this for about a year and a half. Cavanaugh also stated that he was suffering from a heart ailment and assured the Court that, under no circumstances, would he again attempt to practice medicine in any manner whatsoever without being licensed.

Dr. Halloran, who is 64 years of age, and who is licensed to practice medicine, with an office at 32 W. Central Avenue, St. Paul, plead guilty, in Municipal Court, on May 5, 1939, to a complaint charging him with the sale of intoxicating liquor without a license. Dr. Halloran stated that he, too, had been writing fictitious medical prescriptions for alcohol and selling them to Mr. Sundry for 15c apiece. The records show that Halloran wrote 140 such prescriptions from January 1 to April 30, 1939. Halloran stated to Judge

Rensch that he was unable to pay a fine and assured the Court that, in the event any leniency was shown him, he would absolutely refrain from writing any liquor prescriptions in the future, whereupon, Judge Rensch sentenced Dr. Halloran to a term of 90 days in the St. Paul Workhouse and placed him on probation until November 25, 1939. Dr. Halloran was also required to appear before the Minnesota State Board of Medical Examiners at its next regular meeting in connection with the suspension or revocation of his license as a physician.

Sundry, who is 45 years of age, and a registered pharmacist, plead guilty in Municipal Court on May 5, 1939, to a complaint charging him with the sale of intoxicating liquor without a license. Sundry, who has a record of three previous convictions, was sentenced by Judge Rensch to a straight workhouse term of 30 days. The records show that Sundry was fined \$350.00 in Federal Court in April, 1930, for selling liquor without a license. In July, 1937, he plead guilty in the Municipal Court of St. Paul, to selling liquor without a license and was fined \$100.00. In April, 1938, he was tried by a jury in the Municipal Court of St. Paul, found guilty of driving a motor vehicle while under the influence of intoxicating liquor, and fined \$100.00.

The Minnesota State Board of Medical Examiners intends to cooperate with the State Liquor Control Commissioner and the local police authorities in their efforts to stamp out the unlawful activities of a certain group of physicians and druggists who conspire to evade both the Liquor Control Act and the Medical Practice Act of Minnesota. This small group of physicians and druggists bring into disrepute all practitioners of medicine and pharmacy, and why it is even necessary, or profitable, to engage in such a conspiracy, is difficult to understand when one considers that in 60 counties out of 87 in Minnesota, the sale of liquor is lawful by those who have a license for that purpose.

Yellow Bone Marrow Concentrate (The Armour Laboratories)

The Council on Pharmacy and Chemistry reports that in 1934 Armour Laboratories presented Yellow Bone Marrow Concentrate, stated to be "a concentrated oily solution of the physiologically active substances which promote the formation of granulocytes and are present in the yellow bone marrow of cattle and other domestic animals used for food by man." It is proposed for use in agranulocytosis. At that time the firm was informed that the Council could not report satisfactorily on the product because of the paucity of clinical evidence. In 1938 the firm reopened the matter and submitted reprints of two articles. The Council's referee reviewed this evidence carefully and reports that the beneficial effect of Yellow Bone Marrow Concentrate (The Armour Laboratories) has been evidenced in six cases of what seems to be true agranulocytic angina; that while this clinical evidence leaves something to be desired, it is recognized that the difficulty in securing cases is real. The Council felt that the evidence was not sufficient to warrant acceptance at this time and voted to hold consideration in abeyance pending the development of future corroborative evidence for the place of Yellow Bone Marrow Concentrate in the treatment of agranulocytosis, meanwhile authorizing publication of the foregoing preliminary report. (J.A.M.A., April 1, 1939, p. 1257.)

REPORTS and ANNOUNCEMENTS

MEDICAL BROADCAST FOR JUNE

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:00 o'clock every Saturday morning over Station WCCO, Minneapolis (810 kilocycles or 370.2 meters) and Station WLB, University of Minnesota (760 kilocycles or 395 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

- June 3—Minnesota State Department of Health
- June 10—Sanitation
- June 17—Health Education
- June 24—Dental Health Problem

AMERICAN CONGRESS ON OBSTETRICS AND GYNECOLOGY

The American Congress on Obstetrics and Gynecology is sponsored by the American Committee on Maternal Welfare. This committee is composed of member organizations with a representative from each, forming the board. The member organizations include the various national and sectional obstetrical and gynecological associations, hospital associations, public health organizations, and nursing associations.

The Central Association on Obstetrics and Gynecology proposed an American Congress on Obstetrics and Gynecology to study the present-day problems in obstetrics and gynecology and their solution. The American Committee on Maternal Welfare was asked to sponsor this Congress. The Congress will be held in Cleveland, Ohio, September 11-15, 1939. The Committee expresses the purpose of the Congress, "To present a program of our present-day medical, nursing, and health problems, from a scientific, practical, educational, and economic viewpoint as far as they relate to human reproduction and maternal and neonatal care." This Congress is not in any sense a legislative body and naturally will take no action relative to maternal and infant care.

There will be sessions for each professional group in the morning with round table discussions. The afternoon meetings will have papers of general interest to all members attending the Congress. The public will be invited to the evening sessions, where there will be speakers of national prominence.

The program for the physicians will include among many others such subjects as pregnancy associated with: thyroid disease, heart disease, diabetes, tuberculosis, nutritional factors, carcinoma of the female genitive tract, and abortions.

The Congress is not planned as a meeting for specialists in any sense of the word but for all physicians who are interested in the problem of maternal and child welfare. Your committee highly recommends this Congress as a week of postgraduate work which should be worth while much more to the physician than the time and expense incurred for the trip. The physicians of this state should be well represented at this Congress.

The membership fee of \$5.00 includes membership in the American Committee on Maternal Welfare and registration in the American Congress on Obstetrics and Gynecology. Application blanks and further information may be secured from your chairman, or from the American Congress on Obstetrics and Gynecology, 650 Rush Street, Chicago, Illinois.

AMERICAN CONGRESS OF PHYSICAL THERAPY

The eighteenth annual scientific and clinical session of the American Congress of Physical Therapy will be held September 5, 6, 7, 8, 1939, at the Hotel Pennsylvania, New York City. Preceding these sessions the Congress will conduct an intensive instruction seminar in physical therapy for physicians and technicians, August 30, 31, September 1 and 2.

Physicians are urged to plan their vacation for these periods and bring their families to New York for the World's Fair.

The instruction seminar should prove of unusual interest to physicians and technicians. Registration is limited to 100 and is by application only. For information concerning seminar and preliminary program of convention proper, address American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago.

REVISION OF THE PHARMACOPEIA

The Convention for the Revision of the Pharmacopeia, which convenes every ten years, will be held in Washington, D. C., May 14, 1940. The convention will elect officers, a board of trustees and a committee on revision consisting of fifty members, seventeen of whom will be doctors of medicine. In issuing the call, the president of the Convention, Dr. Walter A. Bastedo, requests that the various bodies authorized to send delegates appoint their full quota of delegates and select those informed and prepared to attend the Convention.

MINNEAPOLIS SURGICAL SOCIETY

Stated Meeting, Thursday, March 2, 1939

President, Dr. George R. Dunn, in the Chair.

FRACTURES OF THE SHOULDER GIRDLE

O. J. CAMPBELL, M.D.

Dr. O. J. Campbell showed lantern slides and discussed the treatment of fractures of the shoulder. He emphasized the point that fractures of the surgical neck of the humerus in good position should not be placed in full abduction where the fragments may slip out of place. Rather, a compromise should be made with as much abduction as will permit maintenance of the original satisfactory position.

TREATMENT AND END-RESULTS OF FRACTURES OF THE HAND AND WRIST

R. E. HULTKRANS, M.D.

In any discussion of fractures of the wrist, their treatment and the end-result, one must realize that a particularly wide variation of fractures is being considered. The most common wrist fracture is the popularly named Colles fracture. This term, Colles fracture, according to Key⁴ is rather loosely used in the discussion of wrist fractures by physicians as well as in the medical literature. Dr. Abraham Colles was born in 1773 and died in 1843. His original article⁵ describes a fracture of the distal head of the radius usually within less than 4 centimeters or approximately 1 inch of the distal articular surface of the radius and with resulting dorsal angulation. Obviously no x-rays were available during his lifetime so that the length of the fragments was based on clinical observation. One might say, therefore, that Colles fracture and fractures of the distal head of the radius are much the same for all practical purposes. Other fractures of the wrist joint will be discussed only briefly at the close of this paper.

In 1931, Dr. George R. Dunn⁶ presented before this society an excellent article on Colles fracture with special reference to fractures resulting in impairment of function. The particular series of cases which he presented showed quite definitely that fractures of this type are not being efficiently reduced and that because of this fact rather high degrees of disability were resulting. In this particular paper, methods of reduction are accurately described as well as the usual methods of immobilization and end-results. His conclusions indicate that the average permanent disability involving the hand and wrist was 14.4 per cent loss of function of the hand and wrist. It is interesting to note that of these cases 24 per cent showed practically no disability whereas 74 per cent showed a rather high degree of disability. The average, therefore, does not seem to indicate a general low degree of disability in this particular type of fracture.

Reviewing the literature further we find that Dr. R. C. Webb⁷ in 1921 advocated the use of palmar flexion and ulnar deviation as a means of maintaining position following manipulative correction of fractures of this type. It is quite apparent that this particular work went unnoticed until quite recently. About 1932 the work of Boehler¹ began to be popularized in this country. His particular work seemed to concentrate on active mobilization of unaffected parts concerned with Colles fracture. He has insisted that proper reduction was of first importance, followed by immobilization in a semineutral position with immediate active use of the fingers and thumb in the particular type of cast described in this work. He claims a high degree of efficiency from the standpoint of little loss of time from work and minimal permanent disability. While he admits that there may be certain fractures of the distal head of the radius that require fixation in marked palmar flexion, the general idea obtained from his work seems to be that marked palmar flexion is much more likely to cause severe disability than is the type of immobilization which he advocates.

With these introductory remarks let us consider then a typical Colles fracture. This type of case is usually seen within a matter of a few hours of the time that the injury occurred. Probably this is because injuries of this type usually result from a fall, and the individual in trying to break the fall stretches the arms or hands out. If a fracture results from such a fall, the immediate symptoms are acute enough to require prompt surgical attention. Rather rarely, an individual may sustain an injury to the distal head of the radius as the result of an accident and may waste a period of twenty-four to forty-eight hours before contacting a physician, but this seems to be quite rare.

Given then an acute Colles fracture the subsequent procedures are quite routine. The patient is usually taken to a hospital and an anesthetic administered and the fracture reduced. Depending on the type of fracture and the reduction obtained, further hospitalization does not appear necessary and most of these patients are usually classed as out-patients. Reduction of fractures in the office can be done, but where facilities are available we would recommend hospitalization.

It would seem that x-rays before and after reduction are imperative. Some men advocate reduction under fluoroscopic control. Our own reaction to this type of treatment is that the detail afforded by fluoroscopic control oftentimes is not sufficiently accurate to give satisfactory results. We prefer the use of the portable x-ray at the time of reduction.

Assuming then that proper treatment has been administered up to the point of immobilization, what type of immobilization is to be used? Here, perhaps is found the widest variation of opinion in the treat-

ment of apparently simple uncomplicated Colles fractures. Some type of moulded plaster splint seems to be indicated quite definitely in preference to the mechanical metal splints offered by many surgical instrument houses. At the present time we feel that the use of the sugar-tong type of splint is by far the most satisfactory. This type of splint is readily made and is covered by a single layer of French flannel. The splint is applied by laying it on the dorsal aspect of the hand and forearm, continuing around the elbow to form the volar portion of this splint and then extending down to the metacarpal phalangeal joints of the hand. This means that the splint encircles the elbow and prevents supination and pronation of the forearm. This splint can be applied with the hand in a neutral position or with palmar flexion and ulnar deviation or any other variation of position desired. After the application of this type of immobilization the circulation is carefully checked and the arm placed in a sling. If the fracture has not been too serious and there is no accompanying shock, the patient is allowed to return home with instructions to watch for any impairment of circulation made apparent by symptoms of cyanosis, coldness of the fingers or sensory changes.

If satisfactory reduction has been obtained as noted on x-ray following the application of the immobilizing splint, further x-rays are usually made at the end of five to seven days to be sure that the position is being maintained. In certain types of fractures, additional x-rays at the end of two weeks are definitely indicated. Immobilization is then maintained until x-ray evidence of union becomes apparent. Subsequent thereto the usual routine physiotherapy methods are used to restore function.

The first case which we wish to present is that of a simple Colles fracture in a woman about sixty-five years of age. She was seen within an half hour after the fracture was sustained and the x-rays disclosed a typical Colles fracture. Reduction was accomplished easily under gas anesthesia and immobilization was done with anterior-posterior moulded plaster splint applied without padding to the skin. A checkup film made five days later showed the position to be well maintained. We felt we had accomplished a perfect reduction in this case and that the end-result would be perfect as well. We advised the patient accordingly and saw her at intervals until thirty-three days after reduction of the fracture another film was made. On this film a marked angulation of the distal fragment had occurred in an amount similar to that noted before reduction. Obviously there was sufficient callus thirty-three days after reduction to prevent any correction by manipulative procedure. She suffered intense pain for a period of about four months following the fracture of the wrist, when the pain became somewhat less. Two and a half years after reduction she was quite free from pain and had good function in the hand and wrist but the deformity was obvious and we felt that a rather high degree of permanent disability had occurred.

We had gone along setting Colles fractures with apparent good results and in many industrial cases with-

out any permanent disability. We felt we could explain the situation in the above mentioned case on the basis of an absorption of the comminuted fragments of the dorsal aspect of the radius. Then we were confronted with a case of bilateral Colles fracture. In this case adequate reduction seemed to have been obtained and repeat x-rays made six days later showed maintenance of the position of the reduction. We felt, however, because of our experience in the preceding case it might be well to keep a little closer observation and therefore requested this patient to report for x-rays two and a half weeks after reduction. These x-rays showed a definite change of position of the fragment with dorsal angulation of the distal fragment of both wrists. Dr. O. W. Yoerg saw the films of this individual and offered this explanation for the slipping of the fragments. He said the patients with bilateral Colles fractures are handicapped a good deal in getting around at times. They use what little function is present much more actively than they would if only one arm were affected. Attempts are made to raise themselves in bed along with other attempts at movement, such as getting up and down from a chair. With the findings of dorsal angulation in both wrists we were confronted with the question of what to do next. This patient had been informed following the original reduction that a good reduction had been obtained and that a good recovery from her injuries could be anticipated. We felt that manipulative procedures could improve the position of the fragment in the slipped position. Accordingly, the patient was again taken to the hospital, given a general anesthetic and a Thomas wrench was used to reduce the fragments to better position. We were fortunate in obtaining a good reduction on the second attempt two and a half weeks after the original fractures were sustained. The subsequent end-result showed practically a normal contour in one wrist and one close to normal in the other. Following the period of immobilization required, considerable disability was present but with a series of twenty baking and massage treatments an excellent function was obtained.

Since then we have had one more case of bilateral Colles fractures, both severely comminuted. Both of these fractures were reduced under a local anesthesia and the position of fixation in each case was marked palmar flexion and marked ulnar deviation. Good anatomical position was obtained after the fractures were firmly united. This case is still under treatment and it is too early to determine whether or not any permanent disability will result.

In conclusion, we have felt that the first case presented could be explained on the basis of the absorption of bone. This may be correct. We feel, however, that had we applied forced palmar flexion and ulnar deviation, much of the deformity would have been avoided. The second case of slipping was recognized in time to attempt a second reduction with apparent worth-while results. The third case of bilateral Colles fracture was treated in marked palmar flexion and ulnar deviation, which we now advocate in all cases of this type where any comminution of the dorsal sur-

face occurs. Certainly, good anatomical reduction and immobilization prevents deformity which may be very noticeable to the patient and definitely lessens the likelihood of permanent disability. The use of the sugar-tong splint for immobilization which prevents supination and pronation but permits palmar flexion and ulnar deviation has been our method of choice.

BIBLIOGRAPHY

1. Böhler, Lorenz: The treatment of fractures, Baltimore: William Wood and Company, 1935.
2. Colles, Abraham: On the fracture of the carpal extremity of the radius. Edinburgh Med. and Surg. Jour., 10: 182-186, 1814.
3. Dunn, G. R.: Colles fracture with special reference to factors resulting in impairment of function. *Journal-Lancet*, 52:162, (Mar. 1) 1932.
4. Key, F. A., and Conwell, H. E.: The management of fractures, dislocations, and sprains. St. Louis: C. V. Mosby Co., 1938, pp. 698-722.
5. Webb, R. C.: Fractures of base of the radius. *Minn. Med.*, 4:151-155, 1921.

Discussion

DR. O. W. YOERG: We are all proud of our good results and are rather hesitant in displaying our poor results or mistakes. We learn more from our cases that have gone wrong than from those that progress without complications. Dr. Hultkrans has given us a frank discussion of some of the pitfalls to be avoided in the treatment of wrist fractures. We have all had similar experiences, a good reduction that later slipped with resulting deformity.

I can only emphasize what Dr. Hultkrans has already mentioned relative to x-rays. I believe it well to x-ray the arm ten days to two weeks after reduction. If the bones have slipped you can still correct the displacement. If the bones are still in place at the end of two weeks and the fracture is properly supported, it is not likely that displacement will occur.

OPERATIVE REDUCTION OF THE NECK OF THE FEMUR

Motion Picture

WILLARD WHITE, M.D.

A motion picture in color was shown by Dr. Willard D. White. This film depicted diagrammatic representation of steps in operations done for internal fixation in fractures of the neck of the femur. These diagrams were followed by the actual operations on patients. Pre-operative and post-operative x-ray films were shown, then the patients themselves were seen at various times after the operation, demonstrating the amount of activity, motion, et cetera. Two types of so-called closed operations were done. One, without the use of any preliminary guide of any kind, the nail being driven in directly after reduction of the fracture following a technic which was described in the film. The other closed operation entails the use of a 3/32 of an inch Steinman pin used as a preliminary guide. A cannulated nail was threaded over this guide and driven in place.

The so-called open operation was done for ununited fractures on patients who were seen several months after the injury. In this, the fracture site was exposed and the reduction done under direction vision, the fracture surfaces freshened, and the fragments united with a Smith-Peterson nail.

REDUCTION OF FRACTURES OF THE OS CALCIS

Motion Picture

O. W. YOERG, M.D.

Dr. Yoerg showed a motion picture entitled "Os Calcis Fractures, an Improved Treatment," describing his method of reduction of these fractures, the after-care and convalescence.

General Discussion

DR. STANLEY R. MAXEINER: I enjoyed the papers this evening very much indeed. Dr. Campbell's reference to the treatment of the arm in less than 90° of abduction is extremely important and calls to mind that during the ten years I was associated with Dr. Farr, in the majority of cases, we treated these fractures in less than 90° of abduction with the Stromeyer pad. A piece of sheet metal approximately 3.5 feet long was bent to make a triangle. This triangle was well padded and the apex introduced into the axilla. The base kept the elbow separated from the hip and the arm was held against the body by the use of a Velpeau bandage. When greater abduction was required the patient was frequently put to bed and traction maintained laterally.

We are very prone in our discussions to neglect the work done by our own members and it affords me pleasure this evening to hear reference made to the splendid work done by Dr. Webb and Dr. Dunn. I recall numerous instances in which references were made to the reduction of Colles fractures under local anesthesia as recommended by Boehler. We all know that Dr. Farr pioneered in work on local anesthesia and was reducing all types of fractures under local anesthesia long before the name of Boehler was popularized in this part of the country.

Thirty years ago while I was an interne at the General Hospital, Dr. Farr treated a comminuted fracture of the tibia and fibula with a Steinman pin through the heel. Subsequently, in 1910 when I became associated with him, we had another severely comminuted fracture of the tibia and fibula which was treated again by the Steinman pin through the os calcis. This patient developed a high temperature of 104°, was highly delirious and went through an attack of typhoid fever. At many times it was scarcely possible to keep him in bed but the traction performed so efficiently that when the patient recovered from the typhoid fever he had excellent reduction of the fracture. To my knowledge these were two of the earliest cases treated with skeletal traction in this community. At that time I remember that Dr. Farr was severely criticized because of the danger of osteomyelitis and numerous other conjectural contraindications.

Recently, we attended a case of Colles fracture that would not remain reduced. On two different occasions the fragments could be readily nudged accurately lined up but immediately after the application of molded plaster splints, the fragments either slipped forward or backward. It was impossible to maintain the distal fragment balanced on the end of the proximal fragment. A Kirschner wire was passed through the heads of the four metacarpal bones and traction applied, counter traction being maintained by a cast about the arm. Reduction was very simply maintained but it was necessary to continue traction over a rather prolonged period and delayed return of function has been quite noticeable. I believe, however, that in such comminuted fractures in which it is impossible to maintain adequate reduction, traction should be considered just as important as in comminuted fractures of

WOMEN'S AUXILIARY

the tibia and fibula. Dr. Allison states that this is the first time that a Colles fracture similarly treated has come to his attention.

I wish again to call your attention to Lahey's recent article on Colles fracture in which he recommends a fixation of at least six weeks in elderly people. He states that prolonged fixation is essential in older people because of slower healing and the more likely development of deformity.

DR. VERNON HART (by invitation): "Each one of the several papers has been extremely instructive and has emphasized fundamental surgical principles in fracture treatment. I should like to make a few remarks relative to each paper.

The principle of splinting fractures of the shoulder in the correct degree of abduction which Dr. Campbell stressed is a very important one. The x-ray studies should be carefully examined and then the degree of abduction determined by the individual problem.

Dr. Hultkrans emphasized many of the mechanical principles involved in the treatment of Colles fracture but he did not stress the importance of proper physiotherapy. We occasionally see patients who have considerable disability resulting from this injury. It is my opinion that most of the disability which we observe in these patients is not due to the inadequate reduction but is the result of inadequate postoperative physiotherapy. I believe that the position of the fragments which Dr. Hultkrans considered rather poor is satisfactory and would be compatible with normal function if proper physiotherapy were instituted. By physiotherapy I do not mean heat, massage, and passive exercises that someone else does for the patient, but I refer to elevation and active exercises which the patient performs himself. Every patient with a Colles fracture should be taught to be his own physiotherapist. These patients often come to us many weeks or many months after their injury with marked disability of the shoulder. They have a subdeltoid bursitis with contractures and adhesions which cause marked limitation of abduction and the rotations of the shoulder. At the time of the original fall, part of the violence is transmitted to the shoulder and there is an impaction between the head of the humerus and the glenoid, and soft tissue trauma. The day of the reduction one should instruct the patient to actively completely abduct, externally rotate and internally rotate the shoulder. This program will prevent shoulder complications. The same day of the manipulation or at least the following day the patient should be instructed to actively move each finger through the full range of motion at each individual joint, to approximate the thumb to the tips of the fingers, to flex and extend, abduct and adduct the fingers and the thumb, and to actively use the fingers in eating, and combing the hair. By active exercises and elevation one can restore motion very rapidly and prevent disability of the thumb and fingers.

I object to the use of the sugar-tongs splint because in Colles fractures with subsequent difficulty there is usually a radial deviation of the distal fragment. The radial deviation of the distal fragment is the most difficult problem with which we have to deal. The dorsal displacement of the distal fragment can easily be controlled by moderate palmar flexion of the wrist. The important position following reduction is ulnar deviation. With a sugar-tongs splint, plaster is placed on the extensor surface and on the flexor surface with a gauze bandage on the radial side. If one wishes to maintain ulnar deviation or to maintain the correction of the radial deviation, then the radial side of the forearm and hand as far as the end of the second metacarpal shaft should be adequately splinted. The simplest and most efficient splint is a non-padded, very thin circular plaster of Paris cast split on the ulnar side but not on the radial side. Besides physiotherapy to the shoulder, fingers and thumb, one should, very early, restore rotation. It is often stated that with a cast on

the forearm incorporating the wrist, rotations should not be encouraged. The patient should be instructed during the first week to try to restore rotations, pronation and supination.

The principle that Dr. Maxeiner mentioned regarding the period of immobilization is important. The cast should be left on for a period of four weeks or five weeks before it is removed, assuming, of course, that proper reduction has been accomplished and maintained. I refer to the fractures which require manipulative reduction.

Dr. White certainly should be congratulated. He has made special studies of hip fractures which is apparent in his presentation tonight. He has shown a very scientific interest in fractures of the hip, and the technique which he has developed is on a very scientific basis. He should be highly complimented. Dr. Yoerg has contributed very much to the treatment of fractures of the os calcis and he has put a stop to the radical treatment of fractures of the os calcis. His method is a conservative and sound one and gives excellent results.

WOMEN'S AUXILIARY

MRS. W. B. ROBERTS, Minneapolis, *President*
MRS. E. V. GOLTZ, 2259 Summit Avenue,
Saint Paul, *Publicity Chairman*

The Washington County Auxiliary was entertained Tuesday, May 9, by Mrs. E. V. Strand at a dessert luncheon at one-thirty at her home in Bayport. Eight members and two guests were present. Mrs. C. Sherman was welcomed into the organization as a new member. Following the business session, plans were discussed for a representation at the state meeting, which is to be held in Minneapolis May 31 to June 2. The auxiliary enlisted its membership in the Minnesota Division of the Women's Field Army of the American Society for the Control of Cancer.

* * *

The Ramsey County Auxiliary held its annual meeting May 22 at the Sibley House, Mendota, where a luncheon was served. Annual reports were read and new officers elected. Mrs. E. A. Nichols, the president, presided.

* * *

Friday, May 5, the annual meeting of the Hennepin County Auxiliary was held at the Minneapolis Y.W.C.A. The following new officers were elected: President, Mrs. E. S. Mariette; president-elect, Mrs. W. E. Willcutt; first vice president, Mrs. Martin Aune; second vice president, Mrs. James Johnson; recording secretary, Mrs. J. K. Moen; corresponding secretary, Mrs. P. J. Schultz; treasurer, Mrs. A. H. McFarland; auditor, Mrs. J. P. Hiebert; custodian, Mrs. L. R. Boies.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of March 8, 1939

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 8, 1939. Dinner was served at 7 o'clock and the meeting was called to order at 8 p. m. by the president, Dr. Carl B. Drake.

There were forty-nine members and one guest present.

Minutes of the February meeting were read and approved.

The Secretary then read two proposed amendments to the Constitution, as follows:

Article III, Sect. 1, just ahead of the last paragraph: "There shall also be a Senior Membership."

Article III, Sect. 2, to be inserted at end of section: "Senior members shall be those Active, Associate or University members who have paid dues for a period of 25 years and who have presented a written request to have their names taken from those lists and placed on the senior membership list, provided their request has been approved by the Executive Committee and favorably acted on in open meeting. Senior members shall enjoy all privileges of active members excepting that they may not hold office or participate in elections. Attendance at meetings is not obligatory. Senior members will not pay dues but will be expected to pay the usual dinner fees. The transfer of any such name to the senior membership list shall create a vacancy in the other membership lists, provided said member has not been a former president of the Academy."

These amendments had been approved by the Executive Committee and will be published on the next bulletin and voted on at the April meeting.

The scientific program followed.

AUDIOMETERS AND HEARING AIDS IN MEDICAL PRACTICE

HORACE NEWHART, M.D.
Minneapolis

and

PROF. HENRY HARTIG
University of Minnesota

Dr. Newhart, Minneapolis, read a paper on the above subject, and Professor Henry Hartig, of the Electrical Engineering Department at the University of Minnesota, demonstrated the use of the audiometer and two hearing aids of different manufacture. Lantern slides were shown.

Discussion

DR. CHARLES E. CONNOR, St. Paul: "The selection of the proper hearing aid is frequently a difficult problem; the period of hearing impairment through which the deafened have passed has not only frequently eliminated ordinary adventitious sounds such as the rustling of paper, shutting of doors, but has also permitted the development of the hypersensitive, introspective psychology so characteristic of the deafened. Then, too, they

not infrequently possess much information (or misinformation) based on the experiences (happy or unhappy) of their friends, on advertisements in the public press, and on high-pressure sales talks of self-styled audiometrists in jewelry and department stores.

Or they may have tried to pick a hearing aid on their own initiative. They have been placed across a table from a person trained in the technic of salesmanship, in a sound-proof room; no wonder they hear better. But, on taking the aid home, they are surprised and discouraged to find they can't hear so well. Then they come in and want to know what is to be done.

A period of psychological re-education is fundamentally necessary for these people. Adventitious sounds obscure what they are trying so hard to hear and after a little while they become nervously fatigued and completely discouraged. Their greatest need is sympathetic, intelligent, and disinterested guidance and the realization that much time and patience is required to effect the readjustment necessary to secure the greatest benefit from their hearing aid.

CEREBRAL CALCIFICATION

GORDON R. KAMMAN, M.D.

Department of Nervous and Mental Diseases
University of Minnesota
Saint Paul, Minnesota

Abstract

Cerebral calcification may occur physiologically or it may occur as a pathologic manifestation. Pathologic calcification may occur symmetrically or asymmetrically.

Symmetrical cerebral calcification usually occurs in the basal ganglia and is easily diagnosed roentgenographically. In this condition the changes are in and about the finer blood vessels, particularly in the lenticular nuclei.

Asymmetrical cerebral calcification may occur in any one of a number of pathological conditions. A particularly interesting type is that known as Parkes Weber-Dimitri disease. In this condition the calcification is unique in that it appears to be tubular and corkscrew-like, and seems to follow the outlines of the gyri of the brain.

In both symmetrical and asymmetrical calcification, including Parkes Weber-Dimitri disease, epileptiform seizures and mental deterioration are the most common symptoms. Defects in the visual fields, facial nevi, parkinsonism, cerebral atrophy, and choked disc have also been reported.

The case reported here is that of a 21-year-old single female who had epileptiform seizures, optic atrophy, visual field defect, and the characteristic roentgenographic picture of Parkes Weber-Dimitri type of cerebral calcification. Encephalograms showed cerebral atrophy.

(Full paper to appear later in MINNESOTA MEDICINE)

The meeting adjourned.

A. G. SCHULZE, M.D., Secretary.

BOOK REVIEWS

BOOK REVIEWS

Books listed here become the property of the Ramsey, Hennepin and St. Louis County Medical Libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

A MANUAL OF FRACTURES AND DISLOCATIONS. Barbara Bartlett Stimson, A.B., M.D., Med. Sc.D., F.A.C.S. 214 pages. Illus. Price, \$2.75. Philadelphia: Lea & Febiger, 1939.

This manual was compiled by Dr. Stimson, a member of the staff at Columbia-Presbyterian Medical Center, for the use of students. For the student it can be a great aid, but it can hardly be regarded as a source of information for the practitioner who is involved in the actual care and management of fractures and dislocations.

A summary of the salient points regarding each fracture is appended to each discussion. The illustrations are unique and forceful by the simple process of being semi-diagrammatic. The treatment discussed is well founded and generally recognized.

Criticism might be directed at the lack of interpretation of findings in the light of muscle mechanics and also at the lack of emphasis on the x-ray as a means of diagnosis and as an aid in following the progress of healing.

The book is divided into a first part, which concerns such matters as the physiology of bone repair and the principles of treatment of fractures. The remaining three parts consist of chapters on the upper extremity, the trunk, and the lower extremity, respectively.

K. E. FRITZELL, M.D.

CLINICAL GASTROENTEROLOGY. Horace Wendell Soper, M.D. 314 pages. Illus. Price \$6.00. St. Louis: The C. V. Mosby Co., 1939.

The author states in the preface that "The object of this work is to cover the field of gastroenterology with particular emphasis on diagnosis and treatment," and he appears to have produced a work that is interesting and informative.

It should be of great help to the general practitioner, as it not only covers organic disease of the digestive tract, but functional disturbances as well. These comments are particularly valuable since the majority of texts on this subject make no attempt to emphasize the importance of such disorders.

Diverticulosis of the colon, polyposis of the colon and regional ileitis are some of the conditions described, as well as the more widely discussed peptic ulcer. The author has also included chapters on diseases of the liver, pancreas and gallbladder, and presents the technique of the ever-important proctoscopic examination.

The book has a practical value for anyone treating digestive disorders, and should prove a great aid to the man who does his own gastrointestinal x-ray, as the book contains many reproductions of characteristic radiographs.

There is enough of the physiology of the digestive tract to make it interesting and instructive to the average man, and an excellent bibliography for those who wish further details.

RICHARD BARDON, M.D.

A CONVENIENT OFFICE TREATMENT FOR TRICHOMONAS VAGINITIS

THIS simple treatment requires but two office visits, a week apart, for insufflations and the nightly insertion of a Silver Picrate suppository for twelve nights.

Complete remission of symptoms and removal of the trichomonad from the vaginal smear usually is effected following the Silver Picrate treatment for trichomonas vaginitis.

Complete information on request



SILVER PICRATE

Wyeth



JOHN WYETH & BROTHER, INCORPORATED, Philadelphia, Pa.